The NEW ZEALAND JOURNAL OF AGRICULTURE

Vol. 67. WELLINGTON, JULY 15, 1943. No. 1.

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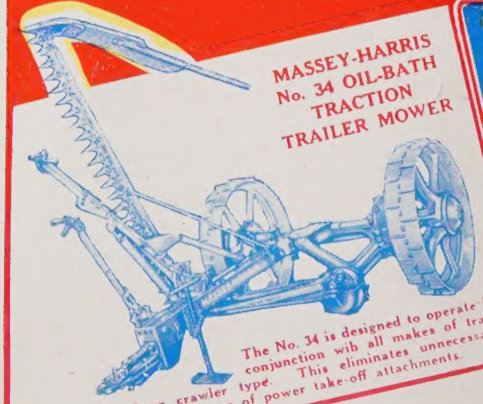

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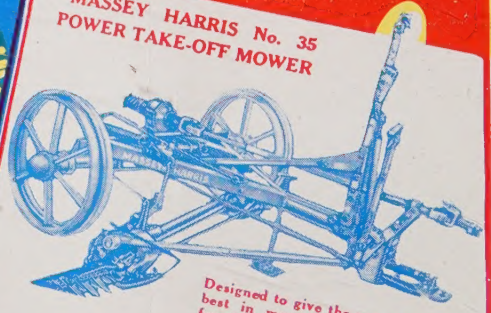

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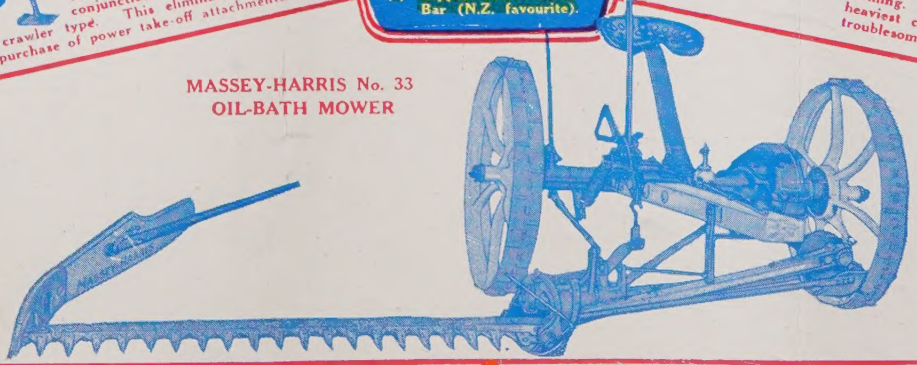

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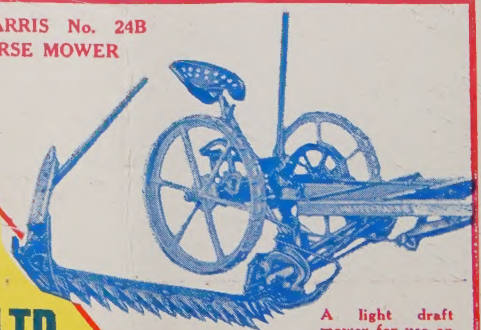

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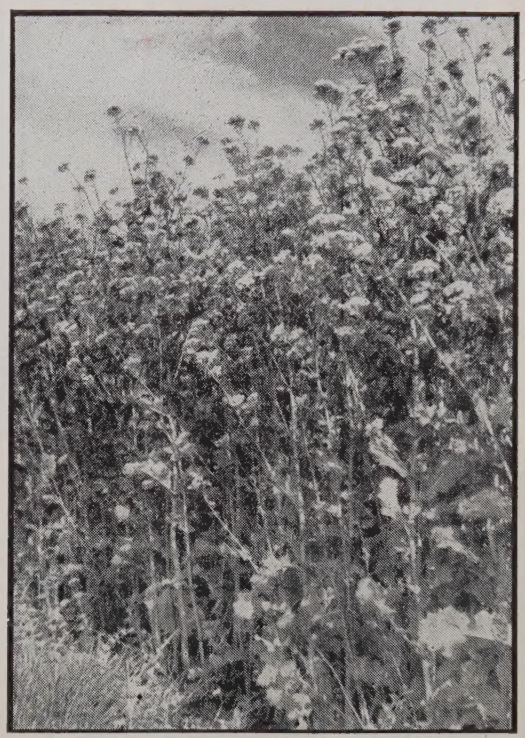
THE NEW ZEALAND
JOURNAL OF AGRICULTURE
Vol. 67. No. 1.
July 15, 1943.
Wellington.
Published by direction of Hon. J. G. Barclay, Minister of Agriculture.

Seed Production in New Zealand

Import and Export Trade

— By —
A. G. ELLIOTT, Fields Division, Wellington.



Turnip seed crop.

THE saving of grass and clover seed has for many years been a common practice in favourable districts in the Dominion, and particularly since the introduction of seed certification it has been a very payable activity. In addition to supplying internal requirements, the value to New Zealand of the surplus exported principally to the United Kingdom, United States of America, and Australia, has been steadily increasing. The visits to Great Britain of departmental officers with a knowledge of the high standard of New Zealand seeds have stimulated interest, and the results from trials laid down in the United Kingdom are assisting further to sell our seed in that country.

The growing of peas for export was also a well-established pre-war practice, which, taken over a number of years, had given a satisfactory return to the grower. Although small quantities of garden seeds were grown locally, most of our requirements were imported, and this applied also to such seeds as rape, turnips, swedes, chou moellier, kale and mangels.

War-time Changes

Towards the end of 1939 the British Ministry of Agriculture advised that no export licenses would be granted for seeds which the Dominion normally imported from that country, and also that seed importation was under control. It later stated that the prospects for New Zealand seed in the United Kingdom were very favourable, and asked that the Dominion should develop seed production generally.

Special emphasis was placed on cocksfoot, white clover, Italian and perennial ryegrass, garden and food peas, rape, carrots, and onions. Consequently, within six months of the outbreak of war, the Dominion growers, through widespread propaganda, were requested not only to increase quantities of grass and clover seeds normally grown, but also to undertake the production on a wide commercial scale of lines with which they had little previous experience.

This demand for New Zealand seed in the United Kingdom was caused through the loss of other overseas sources of supply, as will be obvious when it is remembered that cocksfoot was imported from Denmark, white clover from Poland, red clover from Rumania and France, rape from Holland, and peas from Austria and Morocco. With the assistance of merchants and through propaganda by members of Primary Production Coun-

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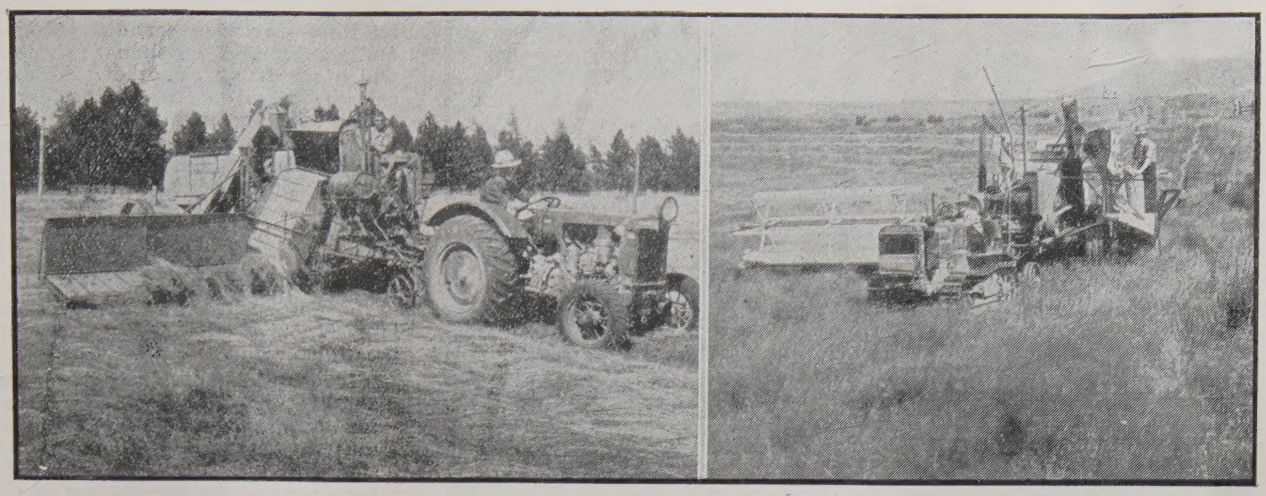

Harvesting ryegrass seed.

Harvesting browntop seed.

cils, and by the Department of Agriculture the farmers of the Dominion rose to the occasion, with the result that seed production was increased considerably and the quantities required by the United Kingdom were harvested in almost every line. In addition, local growers engaged in producing garden seeds formerly imported from Great Britain have made such progress in the last two years that the Dominion has become practically self-supporting in many of the principal lines.

TREND OF EXPORTS (TONS).

	1938.	1939.	1940.	1941.	1942.
Perennial ryegrass	401	406	101	1079	969
Italian ryegrass	46	248	231	945	1172
Cocksfoot .	89	128	194	233	105
Chewings fescue	580	656	874	944	743
White clover	172	167	329	684	518
Red clover	110	222	250	243	436
Peas	7415	7311	9335	11,439	13,178
Onions ..	—	—	—	8	15

Perennial Ryegrass.—Australia was the principal importing country until the last two years, when the United Kingdom purchased greatly increased quantities due to increased demands occasioned by the change in farming conditions, a lower local yield than was anticipated, and the loss of other sources of supply.

Italian Ryegrass.—As with perennial ryegrass up to 1940 Australia purchased most of the Dominion seed, but in the last three years the United Kingdom importations rose from 150 tons to 634 tons, and last year to 1073 tons.

Cocksfoot.—The Dominion has been unable to supply the requirements of this seed to the United Kingdom, which has always imported considerable quantities. The amount sold to Australia has been steadily decreasing, but lower production in New Zealand has been due to unfavourable harvest conditions, and, more recently, to losses in yield due to insect attack.

Chewings Fescue.—A steady trade has been maintained principally with the United States of America, which normally imports two-thirds of our seed, the balance being exported mainly to the United Kingdom. Chewings fescue in pre-war times was shipped to the United States of America in refrigerated space owing to the fact that germination is seriously affected by conditions of humidity and temperature. Under the Federal Seeds Act seed on arrival must contain 75 per cent. pure germinating seed, and while little difficulty was experienced when refrigerated space was available, under present conditions when lines are forwarded as ordinary cargo, and often in relatively slow vessels, with shipping space at times not available, some seed has been refused entry owing to low germination. The question of shipping space generally has been the subject of negotiation, and a shipping quota is now permitted by the United States authorities. The figure is an approximate average of exports over the last three years, and is satisfactory to Dominion growers and merchants. There is no restriction placed by United Kingdom authorities on seed of low germination entering that country.

White Clover.—The United Kingdom has always been the principal purchaser of this seed, and the greater quantity exported has been due to the increased demand and the loss of other sources of supply. In 1941 the quantity exported to the United States rose considerably, and there is at present a market for an increased amount for that country.

Red Clover.—As with white clover, most of this seed was exported to the United Kingdom, and the total sold there last year showed a considerable increase.

Peas.—Perusal of the list of exports shows that the Dominion has for many years exported a considerable quantity of garden, food, and partridge peas, of which the United Kingdom purchased two-thirds of our surplus seed. The exports to that country rose from 5042 tons in 1938 to 8839 tons in 1942. Australia purchased most of the remainder, and the quantity forwarded there has steadily increased in the last three years.

Rape.—This is the first listed of lines normally imported and which was grown as a war-time project to supply local requirements and to meet United Kingdom demands. Prior to 1942 no appreciable quantities were exported, but in that year approximately 100 tons were sold overseas. From the last harvest just over 300 tons will be exported, mainly to the United Kingdom.

Onions.—Before the outbreak of war the Dominion imported approximately half its requirements, but seed production was developed to such an extent that, in addition to supplying local requirements, the demands of the United Kingdom were met to the fullest possible extent when approximately 8 tons were exported in 1941 and 15 tons in 1942. Onion seed production being a two-year project, the matter of supplying requirements

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Direct heading white clover seed.

presents more difficulties than are encountered in growing other lines, but it is anticipated that the supply available for export from the 1943 harvest is approximately 35 tons.

Vegetable Seeds.—While it is not possible to secure accurate information regarding the seed produced of these lines, it can be stated that through the efforts of local growers and merchants the Dominion has been made self-supporting in many varieties, and importations have been reduced to a very considerable extent. When it is remembered that local requirements have been increased, very largely due to demands for vegetable supplies for use of the armed forces in the Dominion and in the neighbouring theatres of war, the magnitude of the task of producing the necessary seed can be fully realised. In addition, certain quantities of these seeds have been exported so that local growers must be congratulated on the success they have achieved in commercial-scale production of what were in many cases entirely new ventures.

Export Policy

Since the outbreak of war the importation to and export from New Zealand of all seeds has been under strict control, this action following that taken in all Allied countries. To this end an Advisory Committee, acting under the Primary Industries Controller, reviews periodically the total seed stocks in the country and the quantities required for domestic sowings. These figures are obtained by computation from the annual returns of seeds made by mercantile firms. In this way it has become possible to ensure that internal requirements are satisfied before overseas orders are filled, and also to economise in shipping space.

Exports from the Dominion are further regulated by the issue in the importing country of import licenses and the allotting of shipping space for each line of seed. The controlling authority in each of the importing countries is guided in this respect by an Advisory Board.

The introduction of the lease-lend arrangement has also affected our exports, particularly of ryegrass and rape seed to the United Kingdom, but the position was clarified early this year when the British Ministry advised that for seed from the 1943 harvest import licenses would be granted for all lines—except uncertified perennial and uncertified Italian ryegrass—which could find a market. Although certain difficulties are being experienced with the export to the United Kingdom of certain lines of seed now on the market, the British Ministry has outlined its policy for next season, and in view of several very important points this is given in detail:—

Seed from 1944 Harvest

The following conditions govern the importation of New Zealand seed into the United Kingdom next year:—

1. In the case of crops such as peas and rape grown under forward growing contracts the Dominion merchant must first ascertain that the permission of the British Ministry has been secured for the placing of contracts. Merchants have been supplied with a list of pea varieties and the quantities of each for which import licenses will ultimately be issued.

2. In the case of seed normally disposed of by spot sale the Ministry will permit importation of the following quantities:—

Browntop, 50 tons
Chewings fescue, 200 tons
Cocksfoot, 200 tons
Certified Italian ryegrass, 150 tons
Certified perennial ryegrass, 150 tons
Crested dogstail, 125 tons
Certified broad red clover, 12½ tons
Suckling clover, 25 tons
Certified white clover, 250 tons
Certified Montgomery red clover, 50 tons.

The most important effect of the statement by the British Ministry is in the prohibition of importation of uncertified strains of perennial and Italian ryegrass, white and red clover seeds. This matter is dealt with fully in another article ("Uncertified Grass and Clover Seeds"), also appearing in this issue, but its importance cannot be over-emphasised from the point of view of local production and export trade. In certain lines such as cocksfoot seed the requirements of the United Kingdom are considerably greater than have been supplied during the last three years, but now is the time for all seed growers in the Dominion to develop the production of high-quality seeds which will establish themselves not only on the United Kingdom market, but also in other countries, to supply a definite demand in post-war rehabilitation. From the outstanding success achieved in so comparatively short a time it is evident that those farmers who have specialised in the production of various seeds can raise lines which for quality and performance overseas can command a market in open competition.

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In the previous article "Seed Production in New Zealand," reference is made to the present position regarding the imports of grass and clover seeds into the United Kingdom, together with the developments leading thereto. In this article an endeavour is made to place the production of uncertified strains of grass and clover seeds in their true perspective in the light of this position.

UNCERTIFIED GRASS AND CLOVER SEEDS

Where is Their Place in Today's Farm Production Programme?

— By —

J. H. CLARIDGE,
Seed Certification Officer,
Wellington.

CERTIFIED grass and clover seeds have been available to the New Zealand farmer for a period of ten years or more, and most farmers today have some appreciation of their value in comparison with the average lines of uncertified seeds on the market. There is, however, still ample room for improvement in the proportion of certified seeds produced as evidenced by the figures presented in Table I. The question can rightly be asked: "Where is the place of uncertified seeds in the farm production programme of today?"

TABLE I.

Average production of certified and uncertified grass and clover seeds over the period 1937-1942.

	Certified	Uncertified
Perennial ryegrass	2 119 tons	3,664 tons
Italian ryegrass	250 tons	1 238 tons
Cocksroot	218 tons	129 tons
Browntop	146 tons	40 tons
White clover	314 tons	336 tons
Red clover	74 tons	724 tons

Much has been said and written from time to time concerning the advantages accruing from the sowing of certified seeds. Many farmers are convinced that there is no argument against their superiority. Other farmers, having tried certified seeds, are of opinion that uncertified strains serve their purpose as well or better. There may even be others who have never sown certified seeds on their farms.

Overseas Markets

It is not intended here to endeavour to persuade all these farmers to see eye to eye on the question of certified seeds, but rather to focus attention on the volume of uncertified seed being produced, together with the available markets for this seed. In this respect the following figures give a measure of the overseas markets which have existed for various locally-produced seeds.

TABLE II.

Average export of certified and uncertified seeds during the period 1937-1942, with the quantity taken by the United Kingdom shown in parenthesis.

	Certified tons		Uncertified tons	
Perennial ryegrass	302	(82)	350	(113)
Italian ryegrass	*		445	(315)
Cocksfoot	91	(59)	43	(41)
Browntop	113	(63)	35	(24)
White clover	175	(134)	158	(119)
Red clover (1942 figures only)	154	(154)	282	(215)

* No separate figures available but quantities very small and included in uncertified figures.

While these figures give no indication of the export position since the outbreak of war, they do convey very clearly that in recent years New Zealand has been dependent on overseas markets, particularly those of Great Britain, for the absorption of a considerable quantity of uncertified seed. The restriction now being placed by the United Kingdom Government on the importation of uncertified seeds from New Zealand while at the same time requesting that supplies of certified seeds be maintained, must directly concern the farmer who has made a practice of producing seeds of uncertified strains. Justification for this import restriction, if any such were required by the New Zealander with a local knowledge of the behaviour of our various strains, is contained in the following paragraph extracted from an article* appearing in the Journal of the Royal Agricultural Society of England, which refers to a series of trials established in England and Wales in 1941, the seed of New Zealand strains having been supplied for the purpose by the New Zealand Government.

"The present series of trials concerning the New Zealand strains have not yet proceeded far enough. They have gone sufficiently far, however, to show that the New Zealand *certified* types will play a very valuable part in seeds mixtures for use in lowland England. New Zealand certified perennial ryegrass is of the same general type as the Aberystwyth S.24 (hay type). New Zealand *pedigree* cocksfoot is of the S.26

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(pasture *cum* hay) type. New Zealand *certified* white clover is of the large-leaved type, not dissimilar to the Aberystwyth S.100. New Zealand certified Montgomery red is similar to the British-grown Montgomery red and is distinctly earlier (and perhaps less persistent) than the Aberystwyth S.123. Suffice it to say, however, that the New Zealand *certified* and *pedigree* seed can be used with confidence during the next few years, when seed supplies are bound to be short. On the other hand great care needs to be taken if *uncertified* stocks of New Zealand seeds are offered for purchase. *Uncertified* New Zealand perennial and Italian ryegrasses, for example, are likely to be articles of inferior value, while ordinary *uncertified* New Zealand white clover may also prove to be of a non-persistent type. When buying New Zealand seed, therefore, one should always specify *certified* strains."

The harvesting of uncertified seeds requires as much labour as does the harvesting of certified.

An Unessential Item

Other overseas markets for uncertified seeds show no signs of expansion while it is a safe assumption that the use of these seeds for sowing locally will show a falling tendency, irrespective of any reduction in price which might follow the loss of the British market for these seeds. Where then does a future market lie for them?

The maximum utilisation of all available resources is of vital importance to the country but it is obvious that the continued production of an unessential item—and a large proportion of the uncertified strains of grass and clover seeds must now be placed in this category—is not conducive to maximum results. This opinion would stand even were it expressed in contrast to the value of the particular item to the individual farmer. When, as in this instance, the national and the individual views coincide, however, for them to pass unheeded would indeed be serious.

To maintain production of uncertified strains of grass and clover seeds at its present level means nationally an expenditure of labour, machinery, and man-power in an effort not essential to the country as a whole. To the individual producer the action entails an expenditure of finance and effort in producing an article the demand for which is lessening, and which, by over-production, will result in a reduced financial return.

It is logical, therefore, to say that the production of grass and clover seeds of uncertified strains must be curtailed in the general farming programme of the immediate future, irrespective of whether the released effort is directed to the production of seeds of certified strains, or to other avenues of essential agricultural production.

***The R.A.S.E. Trials: Seeds Mixtures and Direct Reseeding: William Davies and T. E. Williams (1942), Journal of Royal Agricultural Society of England 103, p. 187.**

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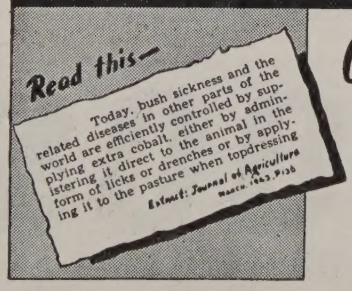
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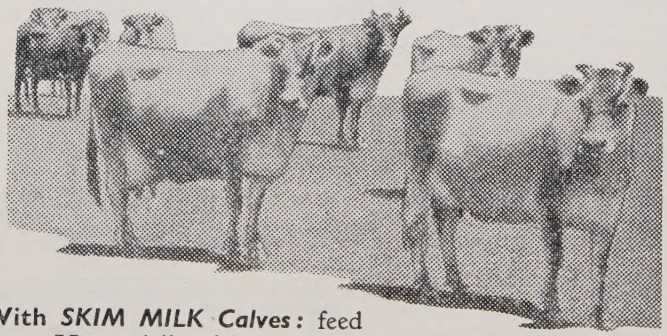

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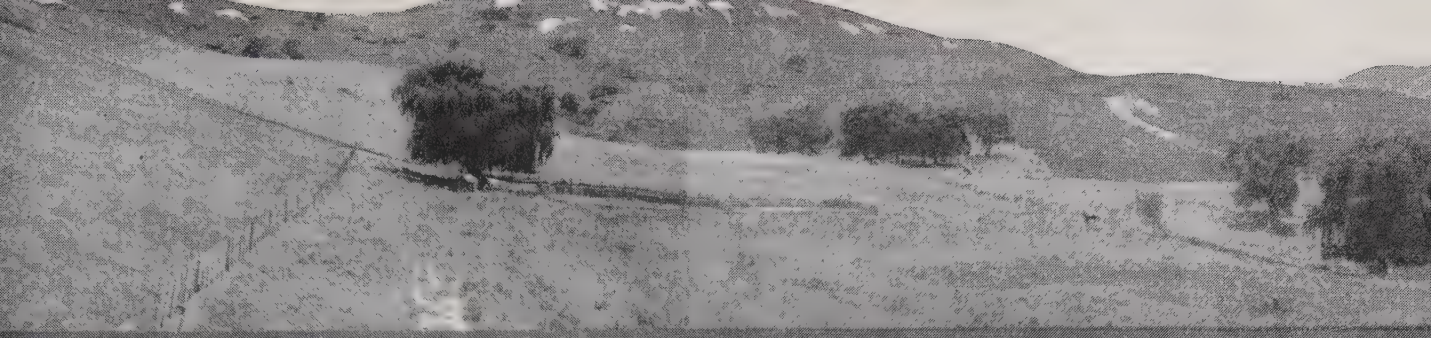

Soil Erosion—A World Problem

Man's Duty to the Soil

DR. Lai-yung Li left China in 1938 to study horticulture in the U.S.A. He was returning to China in December, 1941, when his journey was interrupted by the outbreak of war in the Pacific. He reached New Zealand unexpectedly, and while awaiting a passage to his homeland he is employed as an assistant botanist in the Plant Research Bureau, Department of Scientific and Industrial Research. "Man's Duty to the Soil" is the first of a series of four articles on Soil Conservation specially written by Dr. Li for the Journal of Agriculture.

SOIL is the mother of all forms of life—plants, animals and men. Everything that our bodies require with the exception of air and sunlight comes from the soil. Nature has been kind to the soil but man has been rude. He overcuts the timber-land, overstocks the pasture-land, and overploughs the crop-land. He pours fertility year after year into the cities, which in turn pour what they do not use down the sewers into the rivers and the ocean*. Through ignorance and carelessness man has destroyed millions of acres of good land.

The land is now occupied; the best is in cultivation. Solutions to the overcrowding of land are being sought by different countries in different ways, some by reclamation and conservation; others by **conquest!** Many nations are now awakening to the menace of the prodigal wastage of the soil. For the good of humanity, we must change our course from exploitation of soil resources to a policy of soil conservation and with it, flood control.

The social aspect of soil wastage is that no man has the right to destroy soil even if he does "own" it. The soil requires a duty of man which we have been slow to recognise.

What is Soil?

The following paragraphs taken from the summary of a lecture† will serve as an introduction to this series of articles dealing with soil conservation.

Soil is more than a chance mixture of rock material and organic matter. We must be educated to think of soil as a naturally developed body—a product of action and interaction of minerals, biological activities, climate, and time. It is dynamic and ever changing. The process of soil development is generally slow. Under natural conditions (such as in the prairie or in the forests), the rate of soil formation slightly exceeds that of soil erosion, and as a result soil is formed. Under thoughtless management by man, soil is often rendered structureless, arid, leached, lifeless, and finally wasted away bodily.

Nature is impartial to man's doings. She gives due returns to what man has sown. Thus, on China, for example, is written nature's long record of land use by man. Wherever soil conserving practices such as the maintenance of terraces and temple forests are found, soil continues to serve man, giving him food, shelter, and clothing. Conversely, wherever soil destructive practices such as deforestation, ploughing up and down the slope, over-grazing, and burning of vegetation have been employed they have changed a greater part of North China to a near-desert.

The United States, on the other hand, illustrates how destructive man can be to the soil within a relatively short period of time. Over only a period of two hundred years a tremendous acreage of land has been destroyed.

Causes of Erosion

Fortunately, the tide is now turning. Man has finally wakened to the evils and injustice done to the soil. Considerable amount of research work has already been done on soil conservation, mainly by H. H. Bennett and W. C. Lowdermilk and their associates of the U.S. Soil Conservation Service. Through these researches (especially those dealing with water penetration, percolation, ground-water movement, stream-flow, surface run-off, evaporation, transpiration, interception of water), the emphasis of combating soil erosion has been shifted from the **gullies** to the **water-sheds** as the centre of attention, recognising the fact that soil erosion, like tuberculosis in man, is the development of a long complicated process. The development of gullies and landslides one sees on the hills and mountains is but the final manifestation of the disease. To treat a disease, we must search for its cause. Careful diagnosis of the disease of soil erosion shows that the fundamental cause lies with the **impermeability** of the **water-shed.** Hence, an important

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step toward conservation would be to find out ways whereby agricultural enterprises will increase the permeability of the soil. For, if all the raindrops can permeate through the soil freely, there would be very little water to constitute surface run-off which causes erosion on the slope and flood on the plains. But that is no simple matter, a great many factors are involved. Some of these I shall discuss in later articles.

Stewards of the Land

In the light of present knowledge of the evils of soil deterioration, it is important to stress that man must be taught to think of land as more than a piece of property to be purchased with money or to be sold—to own it is to possess the freedom of treating it in any way he chooses. We must regard land as a priceless gift of nature which we are to **share** with our fellowmen of our generation as well as with those of generations to come. In other words, we must be good stewards of the land. Education must be enlisted to make the people **soil conservation minded.** A definite national and international policy for soil conservation must be formulated by all Governments to guide the way of preventive measures, and if necessary (even in democracies) laws must be made to prevent the ruthless treatment of the land in private ownership.

Finally, I would like to quote Dr. Lowdermilk's "Eleventh Commandment"‡ (written on Palestine while making a survey of land use in that part of the world).

"If Moses had foreseen what was to become of the 'Promised Land' he would have been inspired to deliver an 'Eleventh Commandment.' Such a Commandment would read somewhat as follows:—

'XI. Thou shalt inherit the holy earth as a faithful steward, conserving its resources and productivity from generation to generation. Thou shalt safeguard thy fields from soil erosion, thy living waters from drying up, thy forests from desolation, and protect thy hills from overgrazing by thy herds, that thy descendants may have abundance forever. If any shall fail in this stewardship of the land thy fruitful fields shall become sterile stony ground and wasting gullies, and thy descendants shall decrease and live in poverty or perish from off the face of the earth.'"

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*U.S. Dept. Agriculture Year Book, 1938 (Preface by H. A. Wallace).

†Li., L. Y., 1942 (unpublished). Some Aspects of Soil Erosion in China and in the United States—a lecture delivered before the Wellington section of the Royal Society of New Zealand, May 27, 1942.

‡Lowdermilk, W. C., 1940: "The Eleventh Commandment." "American Forester" (Jan.), 1940.

The Linseed Crop in North Canterbury

— By —
J. P. BEGGS,
Instructor in Agriculture,
Rangiora.

THE linseed crop in New Zealand is grown practically entirely in Canterbury, with North Canterbury (the region north of the Waimakariri River) the most important district. In the 1938-39 season, 1203 acres of a total of 1821 acres of linseed produced for threshing in New Zealand were grown in North Canterbury.

The acreage of linseed produced in North Canterbury has fluctuated greatly from year to year, probably more so than any other farm crop. There are two main reasons for this—fluctuations in price and seasonal weather conditions. In regard to price variations, one year, an abnormal one certainly, when the price fell from over £40 per ton to £9 per ton in a few months, will serve to indicate the uncertain nature of the demand for this product. Again, in other years when the price offered has not been really attractive to farmers it has so happened that, owing to unsettled weather in the early spring preventing the preparation of the land for other crops, a fair area of linseed has been sown. This is explained by the fact that linseed can be drilled later than most other spring crops.

Soils

The majority of the linseed produced in North Canterbury has been grown on the clay loams such as are found on the "downs" land in the vicinity of Cust, Springbank, Loburn, and Sefton. It is probably owing to this fact that it has become widely believed that a clay type of soil of a semi-acid nature is most favourable to the growth of the crop. This is not so. It will be found that a more fertile type of soil will produce a heavier yield of seed; and the reason for the adoption of linseed growing on the clay downs is to be found in the fact that the better types of soil yield a more payable return when utilised for other crops.

The Rangiora and Kowai counties contain a high percentage of the clay down type of land as does the Ashley County, and these three are the highest producers of linseed in North Canterbury. The Oxford county is next in importance, while the Cheviot, Waipara, and Eyre counties have produced only small amounts. The area grown in the Amuri county has been negligible.

Climatic Conditions

In regard to the climatic conditions required for satisfactory growth of the linseed crop, an average annual rainfall of approximately 25in, such as is experienced in North Canterbury, has proved suitable. Annual rainfall, however, is a poor guide to the climatic requirements of the crop, the main essential being that sufficient rain be experienced during the growing period to ensure that it undergoes no severe check. Although frequent showers are very beneficial in feeding this shallow-rooted crop, it is also essential for the production of good crops that reasonably warm and sunny conditions are experienced during the growing and ripening periods. North Canterbury usually fulfils these requirements fairly well. Further, for the production of a high seed-yield it is necessary that conditions be moist during the flowering period of the crop. This results in greater branching in the seed heads with the resultant formation of more bolls per plant.

Place in Rotation

The best results with linseed have generally been obtained when it has been sown after grass, and this can be recommended as the safest place for the crop in the rotation. However, good results are frequently obtained after cereal crops provided the paddock

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is in reasonably good "heart." The growing of linseed after root crops is not recommended.

A suitable and common rotation that has been followed in North Canterbury is as follows:—Run-out pasture, linseed, wheat, oats, grass. Wheat is almost invariably a good follow-on crop for linseed.

Varieties

There are two main varieties of linseed which have been grown extensively in North Canterbury. These are Blue Riga and Bill Moose. The latter is a much larger seeded type than the former and was grown fairly extensively for some years following the 1914-18 World War. Of late years, however, Blue Riga has been used practically exclusively.

The Bill Moose has a higher percentage oil content than Blue Riga and is a good yielder, but owing to the shortness of its straw harvesting operations are not so easy as with the taller Blue Riga.

The Seed-bed

It has often been stated that the ideal preparation of a seed-bed for the linseed crop is to plough, say old brown-top pasture, in May or June, leave the land lie in furrow through the winter, and work the top-soil lightly in the spring before sowing. Although this has given good results in many instances it is by no means the only satisfactory method of preparing land for the crop. An equally good, if not superior, procedure is to skim plough and work the turf mat in April, plough deeply in July, and cultivate the surface in the spring before sowing.

The success of the one-furrow method has probably been largely due to the production of a firm seed-bed, as a well-worked and well-consolidated seed-bed is indispensable in giving linseed a good start. But the necessary consolidation when using the skim ploughing method can easily be obtained with the roller, and in dry seasons a seed-bed prepared in this way will possess a superior supply of moisture to similar land worked under the one furrow method. This will be reflected in better finishing of the crop in seasons when rainfall is low.

Sowing

The time of sowing is naturally controlled largely by weather conditions, but on an average it may be stated that during October or early November is the most suitable period in which to drill linseed in North Canterbury. It is a good rule to sow as early as possible consistent with the prevalence of reasonably warm soil conditions. If the weather warms early in the spring it is wise to drill early, but if the spring is late it is sound practice to defer sowing until warmer conditions prevail, for it is important that the linseed crop should, if possible, go ahead without a check from sowing to harvest time. No doubt it is beneficial for all crops to do this, but linseed appears to be more susceptible to, and slower to overcome checks to its growth than are most other farm crops.

Linseed is usually sown with a grain drill in 7in. rows, and in most instances it is drilled only one way, although cross-drilling is occasionally

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carried out. The latter method is quite satisfactory under favourable conditions, but it has its disadvantages, and if good results are to be obtained certain precautions must be observed. Firstly, if the seed-bed is not sufficiently consolidated there will be danger of covering the first drilling too deeply. Further, as another safeguard against over-deep drilling, well-worn coulter tips should be used and the coulters should be set well back. Again, when carrying out cross-drilling, there is always the possibility of operations being halted after the first drilling; while, under present labour conditions, the extra time required for double drilling is a further deterrent to the adoption of this method.

The depth of drilling is very important. If the seed is buried too deeply the plants never recover from the setback, and a poor crop is sure to result. The depth of sowing should not exceed one inch, and a shallower drilling is preferable. The comments in the preceding paragraph indicate useful methods whereby shallow seeding may be ensured. A good practical safeguard against too deep burying of the seed is to have the fertiliser (if this is used) showing in the rows behind the drill. Light harrows only could be employed to cover the seed, or, if so desired, harrowing may be dispensed with entirely.

The rate of seeding varies greatly from farm to farm, but the usual is from 30lb. to 35lb. per acre for Blue Riga, while for Bill Moose double that quantity is required.

Manuring

In North Canterbury there has probably been more linseed sown without than with manure, and farmers report having experimented on numerous occasions with the application of manure in strips across a paddock without any noticeable response. It may be that on such occasions an increase in yield that could not be detected by the eye was brought about. In the absence of definite information on the subject, the use of more than 1cwt. of superphosphate or reverted superphosphate could not be recommended.

Subsequent Treatment

As previously mentioned, linseed is greatly affected by any check it receives during the growing period, and, owing to the clayey nature of the soil on which it is grown, a very common form of check is to be found in the "crusting" of the surface soil after heavy rain before, or shortly after, the plants have broken through the soil. A crop affected in this way will invariably give a reduced yield at harvest time.

In this connection experience with the linen flax crop (which is very closely allied to linseed) has shown that a stroke with light tine harrows will greatly benefit the crop by breaking this crust. Only light harrows should be used for this operation, and damage to the crop will be reduced to a minimum if the tines are sharp. Naturally, fewer plants will be mutilated if the harrows proceed along and not across the rows. A suitable stage at which to carry out this treatment is when the plants are from 2 inches to 5 inches in height.

The difference in growth form between linseed and linen flax is illustrated above. In contrast to the three roots of linen flax on the right, the linseed plants on the left exhibit much tillering at ground level and considerable branching in the seed heads.

Harvesting Methods

The linseed crop will normally be ready to harvest sometime in March. Ripening is often somewhat uneven, and when this is the case the best method of harvesting is the old way whereby the crop is cut with the binder and tied. This will allow the less mature heads to ripen off in stook. If conditions are suitable the crop may be threshed out of stook, but frequently threshing facilities will not be available when required, and in this case the material should be stacked and left approximately six weeks before threshing.

The reaping and tying method, although today possessing the disadvantage of requiring more time and labour than the other methods, has undoubted advantages. The danger of loss through shaking is eliminated by the earlier cutting, and a better sample of seed is usually obtained.

Wind-rowing with the binder followed by picking up with the header-harvester has frequently been employed. This is quite a satisfactory method and saves time and labour compared with the method just described, but there is always some danger of the material being blown from the paddock whilst awaiting threshing.

In recent years direct heading has sometimes been employed with quite satisfactory results. However, although this is definitely the simplest way of dealing with the crop under present labour conditions, it is necessary for the production of good results that ideal conditions should exist. For example, in the case of a crop ripening very unevenly, direct heading would be unsatisfactory; or again, when late rains cause second growth in the crop it would be out of the question to direct head it. A further disadvantage in the adoption of this method in North Canterbury is found in the risk of losing seed before harvest. As the crop has to be left until it is dead ripe there is quite a real danger that a strong north-west wind will cause much loss by shaking the seed on the ground.

Expected Yields

Yields from the linseed crop fluctuate greatly from season to season and from farm to farm. This is largely due to the sensitivity of the crop to weather conditions, and also to the care exercised by the farmer in the preparation of the land. However, it may be stated that 10cwt. to 12cwt. of seed per acre is a good yield. The average would be well below this, but on the other hand exceptional yields in the vicinity of 1 ton per acre have been obtained.

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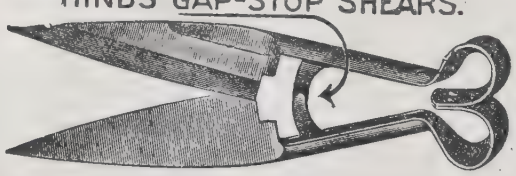

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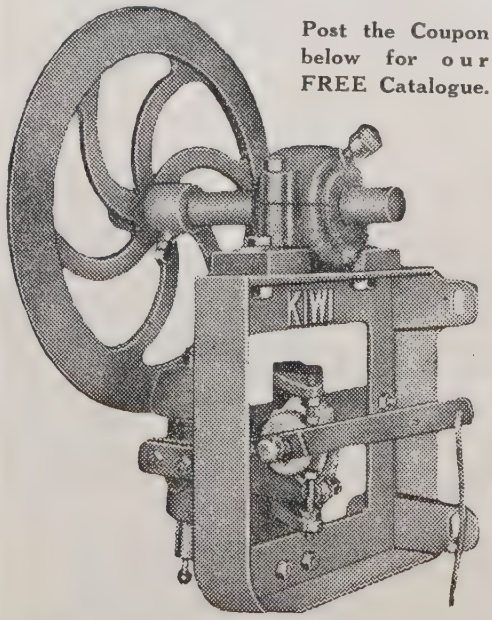

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WEEDS

Much Farm Land Has Deteriorated Through Lack of Control

— By —
S. H. SAXBY,
Instructor in Agriculture,
Dunedin.

THE term "weed" has many definitions, which quite naturally vary with the outlook of the persons responsible for their definitions. One fact that all definitions imply, even if they do not express it, is that, to a farmer a plant is a weed only when its presence interferes with farm production to such an extent that production is lowered. In other words, a plant becomes a weed only when its presence results in financial loss.

This definition is necessarily very broad, because, until one knows the circumstances in which a plant is growing, it is impossible to say whether it is a useful plant or a weed. For example, gorse in a well-trimmed hedge may nearly always be regarded as a useful plant. On the other hand, where it has virtually taken charge of much of our second class hill country, gorse is undoubtedly a very bad weed. Similarly, some of the thistles are useful plants when growing on poor country, but are weeds on first-class country.

Four Major Groups

Weeds may be divided into four major groups, these groups indicating the manner in which the various weed plants are responsible for loss in farm production.

The first and most important is that large group of plants which are weeds because they compete with, and tend to dominate more desirable plants. Into this group fall most weeds of arable crops and pastures. The competition exerted by these weeds varies considerably according to the type of crop, the climate, the nature of the soil, and the kind of weed. On the whole, however, perennial weeds are more serious in perennial crops, the most important of which is pasture. Such perennial weeds are rushes, manuka, blackberry and fern. Similarly, annual weeds are most harmful in annual crops and young pastures. Plants of this type are fat hen, spurry and fumitory.

There is, however, a group of perennial weeds which is equally harmful in both annual and perennial crops. This is the group known as "twitch" or "couch." Although these terms usually refer to some half a dozen or so rhizomatous grasses, they could well be enlarged to include all those plants which have creeping underground or overground roots or stems, portions of which readily form new plants when broken off from the parent plant. Such plants are Californian thistle, sheep's sorrel, yarrow, creeping fog and onion twitch.

The second group of weed plants are parasites—that is, they derive their nourishment entirely from other plants and not from the soil and air, as do most plants. Fortunately, only two such plants are at all common in New Zealand. These are dodder and broom rape. Of these, broom rape is the more common, but appears to do comparatively little harm. On the other hand, considerable damage is periodically done by dodder.

The third group of weeds consists of plants of which various parts cause direct damage to and reduction in value of livestock products. The best known example of this group is bidi bidi, which apart from taking up valuable ground in the pasture is responsible for lower wool values. Several other "burr" plants have a similar effect. In addition, the seeds of some plants, notably spear grass and barley grass, actually penetrate the skin of sheep, reducing the value of both the skin and the carcass.

Yet another type of plant which reduces the value of livestock is that which taints milk. Many plants, varying from turnips to white clover are blamed from time to time as being responsible for tainted milk. Frequently, when tainted milk is produced a search is made and the most conspicuous and likely looking plant is blamed, often quite wrongly. There are, however, a number of plants which unquestionably produce tainted milk. The most glaring example is wild garlic.

The fourth group of weed plants is that which embraces those poisonous to livestock. Exact information on this subject is hard to obtain, and a large number of cases of reported poisoning are a matter of opinion rather than of certainty. Many plants which are known to contain certain poisonous substances are often of common occurrence in pastures, and yet stock thrive on those pastures. In farm animals certain species, and individuals within a species, show marked differences in susceptibility to plant poisons—that is the toxic dose of certain poisons varies considerably from animal to animal. In addition, the chances of animals obtaining a toxic dose of plant poisons also vary.

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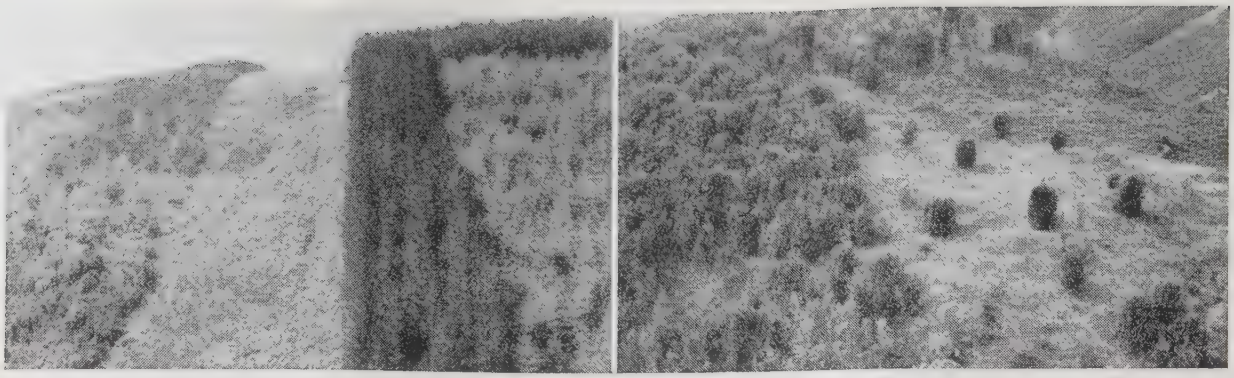

On much second-class country gorse has made tremendous strides. Its elimination and sowing down to pasture is often not profitable, with the result that public bodies have in some areas taken over the land and turned it into profit with large tree planting schemes.

[H. Drake, photo.

As soon as farming in this country began, certain native plants began to interfere with man's farming and hence became weeds. Here, manuka on the left and bracken fern on the right in the background are typical examples.

[H. Drake, photo.

Poisonous Properties

On the whole, therefore, the poisonous properties of many plants vary with both the animals concerned and the conditions under which the plants are eaten. For example, sheep's sorrel is not infrequently referred to as being poisonous to sheep, yet there are districts where sheep depend to a large extent on sheep's sorrel for their fodder, and do well on it. Similarly, the native tutu plant has a bad reputation as a poisonous plant, yet many run cattle have access to it all their lives. Whether they are poisoned or not depends largely on both the condition that they are in and on the extent to which they are forced to feed on it through lack of other feed.

Another example is that of ragwort, the poisonous effect of which is cumulative. For this reason it is most harmful to animals, the life of which farm practice decrees shall be long. Hence, horses and cattle have greater opportunities of becoming affected than sheep or pigs. Sheep are certainly sometimes seriously affected, but this may be obviated by judicious management.

In some publications dealing with plant poisons long lists of plants which are reputed to be poisonous are given,

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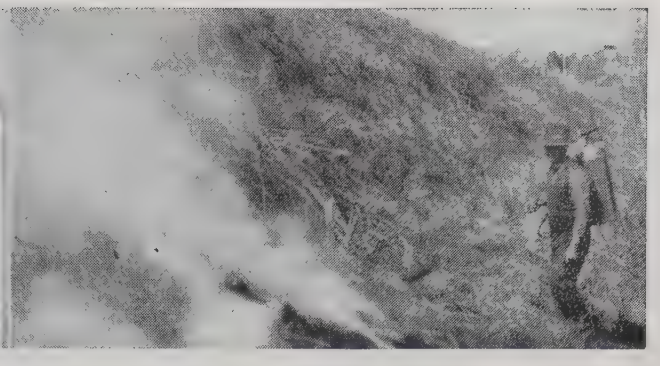
In pastures weeds rapidly gain entry when the sward is damaged by various means. Here, thistles may be seen occupying the portion of a paddock where the sown grasses were drowned out during the winter.

[S. H. Saxby, photo.



The destruction of large weeds on grazing country, whether by burning or spraying, leaves many open spaces, and should be followed by the sowing of suitable grass and clover seed. If this is not carried out, innumerable seedlings will rapidly establish and result in more dense cover of weeds than before.

[S. H. Saxby, photo.

but if they were always as poisonous as stated, there is no doubt that the mortality of stock through plant poisons would be infinitely higher than it is.

Some of our worst weeds are plants which were deliberately introduced into the country from a utility or sentimental point of view. Plants such as blackberry, sweet briar and gorse are introduced plants that have "escaped." If it had been possible to keep these plants either out of the country or at least within their desired confines they would not have presented the major problem that they do now. On the other hand, the greatest number of unwanted plants were introduced accidentally in the early days of colonisation. Many came as impurities in agricultural seeds, some came in the wool of imported sheep, and yet others arrived in packing and ships' ballast.

In addition to the imported weeds, there is a considerable number of native plants which, as soon as farming in this country began, immediately became weeds. Of these, the most striking examples are bracken fern and bidi bidi. Further, there are innumerable other native plants which constitute the secondary growth problem in bush areas throughout the country.

Means of Dispersal

In considering the subject of weeds the question of means of dispersal is of some moment. Once introduced into a country, many plants will, if allowed, spread rapidly by a number of means. During the last hundred years or so some 400 species of plants have been introduced and have become fully naturalised in one or more parts of the country where conditions are suitable to them. Of the various ways in which seeds of weeds have been dispersed within the country, that of impurities in agricultural seeds is probably the most common. Although the dressing of agricultural seeds has now reached a high standard, this has not always been the case, and the trading from one part of New Zealand to another of weed-infested seed doubtless spread the weed population far and wide. Even at the present time, the distribution of cheap pasture seed mixtures means the distribution of many weeds.

Wind plays an important part in seed distribution, especially with plants of the thistle family, whose seeds may be carried many miles in this manner. Animals, particularly sheep, collect a large number of seeds in their wool and hair. When the animals are transported the seed goes with them, to fall to the ground, perhaps many miles away, and to start a new colony of weeds. There is little doubt that much St. John's wort has spread in this manner. Birds also play an important part in weed distribution, of which the most notable example is that of the blackberry. Agricultural implements such as threshing mills and other harvesting machinery, also spread weed seeds when travelling around the country.

Cost of Weed Control

The whole question of weed control is centred around cost. Everyone recognises that weeds are harmful and everyone appreciates the fact that the

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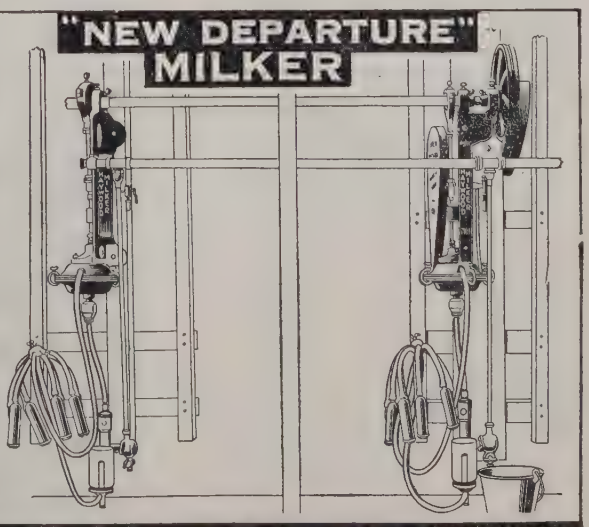

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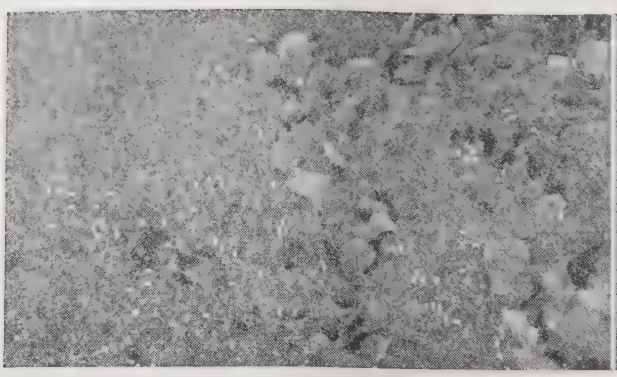

As a rule, annual weeds compete most seriously with annual crops. Here, spurrey is competing strongly with a crop of soft turnips.

Several of our worst weeds are plants which were introduced from a utility or sentimental viewpoint, and have subsequently escaped. Brier (illustrated), gorse and blackberry are of this type.

[*H. Drake, photo.*

cost of eliminating or controlling a particular weed cannot be more than the value of the increased production effected. For example, it is not profitable to clear gorse, manuka, or secondary growth, if the cost of it is greater than the return that will be obtained from the extra stock carried. This is a salient feature of the farming of "marginal land," where cost of clearing and the return from it are almost balanced. If the cost of permanent clearing can be substantially reduced, or if the value of returns are increased, the operation at once becomes profitable.

Similarly, it is well recognised that careful cleaning of mangel, carrot and turnip crops is profitable because the cost of cleaning is more than balanced by the extra yield obtained.

Method of Control

Annual weeds may be controlled in several ways. Firstly, there are many weeds, such as spurrey, fat hen and wireweed, which germinate best in the spring, and consequently affect crops sown at this time. If possible, paddocks known to be infested with weeds of this type should be sown in the autumn rather than in the spring. If, however, it is essential to sow in the spring, as is often the case, a considerable measure of control may be effected by completing the main cultivation operations in ample time before sowing. Rolling and harrowing several times before sowing will do much to germinate and destroy a large proportion of weed seeds in the top soil.

Care should be taken to ensure that cultivation at this stage is not deep. Grubbing, for example, will only bring innumerable seeds to the surface, and the previous work will be undone. Once established in root crops, weeds may be controlled only by repeated hoeings when the weed plants are small. This operation should, of course, be carried out on a hot dry day, if possible, in order to obtain a good kill. In young pastures, annual weeds such as spurrey or fat hen may be kept within bounds by the use of the mower or with sheep.

Many means are adopted to control perennial weeds in pastures, each method depending on the type of weed, the extent of infestation and the value of the land. In some cases, grubbing by hand is an economical proposition, in others it is necessary to burn, plough, or employ heavy machinery.

Weed Killers

During the last few years much has been accomplished in the use of chemical weed killers. Of these chemicals, sodium chlorate and arsenic pentoxide have given the best results. The use of these chemicals will be referred to when specific weeds are being discussed.

The question of the control of weeds by insects has received a considerable amount of attention during the last few years. In some cases such as with prickly pear in Australia, this method

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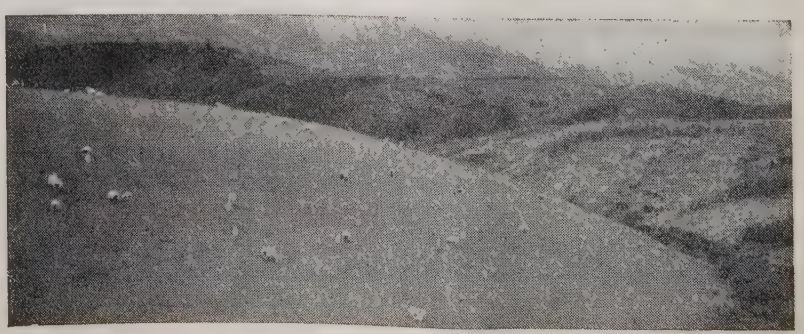


On marginal land there is a constant fight against "weed plants." Here, with the use of suitable species and strains of grasses and clovers, together with lime and phosphate, the "weeds" are kept in check and the pasture rendered productive.

[*S. H. Saxby, photo.*

of control has given spectacular results. This, however, is exceptional, and undue optimism with regard to weed control by insects in New Zealand is not warranted. Complete control is unlikely, and any control that is effected must be regarded as supplementary to existing means. Insects have been introduced for the control of weeds such as gorse, bidi bidi and ragwort, and while some success has already been obtained, it is too early to be dogmatic regarding the ultimate effect of any of them.

In the control of some weeds, such as blackberry and ragwort, animals play quite an important part.

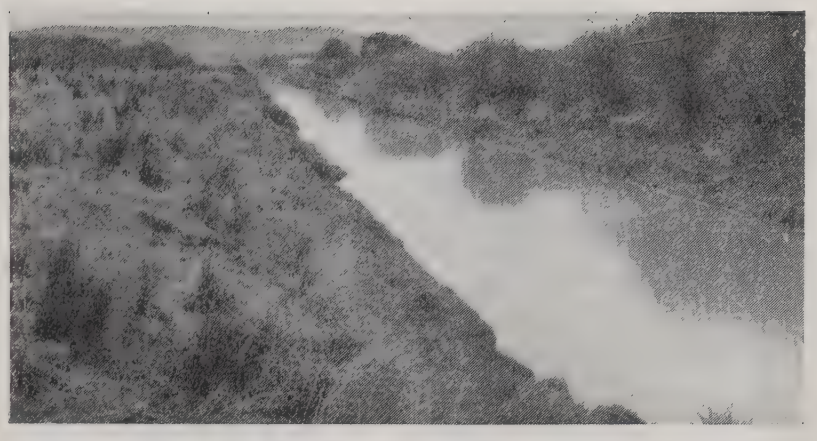
In addition to the foregoing, there are several other aspects which play an important part in weed control. Of these, drainage, lime and fertilisers are all of considerable importance. Many weeds, such as rushes and buttercups, may be eliminated at least partly by efficient drainage, which also has the effect of strengthening the desirable plants.

Liming and manuring also tend to banish weeds such as sorrel and spurrey, not because lime and manure kill them, but because the soil conditions are so improved that useful plants will thrive and ultimately crowd out the weeds.

Suitable Species

The question of the use of suitable species is also closely connected with that of weed control in pastures. On heavy land, for example, the inclusion of foxtail and timothy in mixtures will do much to arrest such weeds as docks and thistles. On the other hand, the use of browntop and *lotus major* on bush burns will at least assist in the control of secondary growth.

The various strains of pasture plants play quite an important part in weed control. Some strains are not aggressive and die out rapidly, allowing weeds to gain entry into the sward. Other strains are aggressive and persistent, thus checking the ingress of weeds.

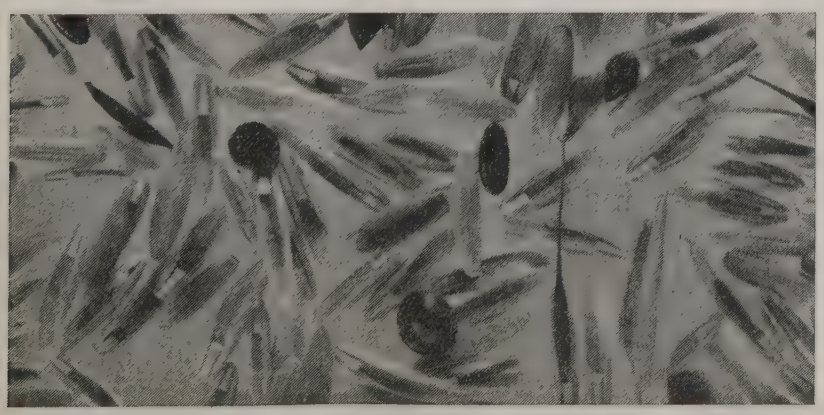


On low-lying country drainage plays an important part in the elimination and control of weeds, such as nigger-head and rushes. Here is shown the outlet drain of a large drainage scheme in Otago.

[S. H. Saxby, photo.

The necessity for sowing seed of a high standard of purity cannot be over-emphasised. It is not only a matter of securing seed with a low percentage of impurities, but also of knowing what these impurities are. For example 1 per cent. of suckling clover in a sample of white clover will do little harm, but a much smaller percentage of dodder in the same sample may cause considerable damage.

One important aspect of weed control which is not given the consideration it warrants is that of the eradication of weeds new to a district. Generally speaking, a farmer should look with suspicion on any unfamiliar plant he finds on his property. He should have it identified, and if the plant has proved to be a menace elsewhere, every effort should be made to eradicate it at once. It is surely easier to destroy a weed species occupying a square yard of ground this year than to wait and eradicate it when it has covered an acre or more in several years' time.



Most of our agricultural weed seeds were introduced, and are still being spread, through the buying and selling of "dirty" seed.

[H. Drake, photo.

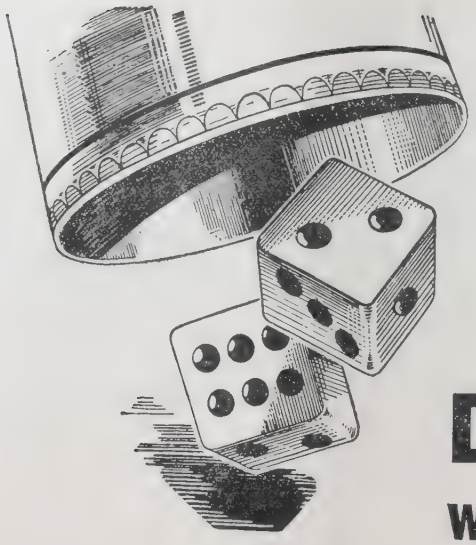
Names of Weeds

All plants have what is known as a botanical (or Latin) name, by which they are known to botanists in every country. "Common names," however, vary, not only from country to country, but also from district to district. Thus, the plant *Plantago lanceolata* in some parts is known as plantain, while in others it is called rib-grass, lambs' tongue, or soldiers. The position is similar with the naming of many of our weeds. Confusion, however, frequently arises when one name is applied by different people to different plants. For example, the name "wart cress" is used commonly in connection with at least four different plants. For these reasons heated arguments often arise regarding the names of weeds. In many cases both parties are quite right in that the name by which they know the plant is the one most commonly used in the district.

There does not appear to be any way of obtaining uniformity of "common names" for plants. Old names die hard, and a change of name is distasteful. Botanical names are frowned on by most people, perhaps not without some justification, as many are tongue twisters. There are, nevertheless, many botanical names that are in common use by farmers and gardeners, and include such as *convolvulus, paspalum, phalaris, Lotus major, Eschscholtzia.*

For the foregoing reasons, it cannot be hoped that the names of every weed described will meet with the approval of everyone. An endeavour, however, has been made to use the commonest and most descriptive name in each case. Where several names are in common use these are all given.

(To be continued.)



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Milk Fever in Dairy Cattle

— By —

D. MARSHALL,
District Superintendent, Livestock Division, Wellington.

MILK-FEVER is a disease associated with parturition, and typically occurs within forty-eight or seventy-two hours of that event—occasionally just as parturition is about to occur, and rarely at from a week to a month later.

It is a disease of the mature cow, rare in second calvers, and unknown in heifers. Similarly, it is seen chiefly in the high producing animals. High condition is a predisposing factor.

Cause

Many theories, such as the formation of toxins in the udder or uterus, anaemia of the brain, and a lowered sugar content of the blood, have been put forward from time to time and then abandoned. While a complete explanation is still lacking, the work of Dryerre and Greig, then of the Royal Dick Veterinary College, Edinburgh, enabled them to put forward the most satisfactory theory to date.

They have shown that in milk-fever cases there is a sudden marked drop in the calcium content of the blood, this returning to normal as recovery is brought about. In the animal body mechanism exists which normally should ensure that the calcium removed from the blood at the commencement of lactation to supply the colostrum and the milk is simultaneously restored by withdrawals from the stores in the bones. The percentage of calcium in milk is about ½oz. per gallon, proportionately higher in colostrum.

The strain on this mechanism is thus highest in the best producing cows. When it fails the blood calcium falls and symptoms of milk-fever appear.

It is evident, however, that there are certain practical points having an important bearing on the occurrence of milk-fever.

Prevalence

It has frequently been noted, and it is known to many farmers that milk-fever is more prevalent in a "grassy" season than in a season when green feed is scarce, and also that where cows are calved off rather hard, dry pastures with a hay ration there is less milk-fever than where they are brought into green flushing paddocks for two or three weeks before calving.

The latter practice is sometimes adopted to ensure that the bowels are in a laxative state before calving, but this end could probably be better attained by the use of ensilage, molasses in hay, or drenching.

Dr. Hopkirk's work with sheep seems to indicate that the change on to the green feed has some depressing effect on the amount of general mineral bases of the blood.

Symptoms

The first thing noted is usually a stilted, staggering gait, and the animal is unwilling to move. As a rule, the general nervous disturbance and the acutely sensitive and easily startled condition present in grass staggers is absent. In exceptional cases which are known to suffer from milk-fever and low calcium there may be a stage of marked excitement, and struggling when the animal goes down.

In the typical case, once the animal goes down, which may be two or three hours after staggering is noted, she rather quickly becomes quiet and dull, with the breathing easy and regular, and with a tendency to throw the head around on to the ribs. The temperature is usually well below the normal level of 101.5 degrees, and may be 100 degrees, 98 degrees or lower. The pulse rate is usually about sixty.

Treatment

While veterinary aid is always desirable, under the present conditions it is frequently unobtainable. Prompt measures are necessary, so that the owner must usually act at once.

Although certain other disease conditions, such as fatty degeneration of liver, acetonemia, and, according to American writers, septic absorption from uterus, may occasionally produce similar symptoms, all animals showing the signs outlined above within forty-eight or seventy-two hours of calving should at once be treated for milk-fever.

The treatment adopted must depend on the stage of the disease. Where the cow is still on her feet staggering a calcium drench carefully given will

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often prevent further development. Such a drench would be:—

Calcium chloride ...	2 oz.
Molasses	2-3 lb.
Water	1½ pints

Another drench used successfully by Dr. Annett, of Matangi, is made by stirring 1 pint of molasses in 1 quart of boiling water, then ½ lb. of hydrated lime, filter through muslin when cool. This mixture will keep some weeks if bottled.

Inflation of the Udder

Once the animal goes down it has been the experience that inflation of the udder must be done. The main essentials are a simple outfit properly sterilised, strict cleanliness of the udder and teats, and inflation until the udder is tight. It is very important that as soon as the udder is inflated the cow should be rolled up on to her brisket and maintained in a sitting posture with sacks of earth.

Where the animal is found flat out and paunch is badly bloated, she should be rolled into a sitting position for a few minutes before inflation is carried out, as this will relieve the bloat and do away with any need for tapping.

Calcium Drench

The calcium drench may be given while the cow is down, if she is able to swallow. There is always a risk of the drench going into the lungs if it is given while she is half-conscious, and no animal in a comatose state should be drenched.

Should the response not be satisfactory within a few hours, the calcium and molasses may be repeated, together with a stimulant dose of 3 drams of carbonate of ammonia and 2 drams of powdered nux vomica. The carbonate of ammonia and nux vomica may be repeated with molasses twice daily. Should there be any constipation an enema of soapy water should be given and the amount of molasses increased.

Care in drenching must be stressed. Septic pneumonia is one of the commonest causes of death in milk-fever, either from the entry of foodstuffs into the lungs when the cow is down flat or from faulty drenching.

Injection Treatment

Where a veterinary surgeon is available he will probably carry out treatment by injection under the skin of a non-irritant solution of a calcium preparation. It has been found that in many cases this is sufficient treatment and does away with the risks attendant on udder inflation (mastitis, etc.). Some farmers carry this out themselves, and solutions and outfits are sold by certain chemists catering for stock owners.

A solution is prepared by adding 2½ ounces of calcium boro-gluconate powder to half a pint of boiling water. The mixture should be kept boiling until powder is completely dissolved and allowed to cool to blood heat before use. The most suitable area for injection is the loose skin at base of neck, in front of shoulderblade, and half should be injected in each side. Clip the hair and swab with a weak antiseptic solution or tincture of iodine.

A suitable apparatus consists of a 12-ounce bottle, widemouthed (pickle bottle type) with a rubber cork, through which pass two glass tubes, one reaching almost to bottom of bottle and one just through cork, and to outer end of which is attached three feet of rubber tubing with a heavy hypodermic needle at the free end. Failing this, a small funnel may be used with the tube and needle. Place the solution in the bottle, insert needle through the skin in a direction almost parallel to it (it should not penetrate deeper tissues), then invert the bottle and raise it so that the solution flows in. Gently massage the swelling formed by the solution so that it is distributed.

Prevention

Avoid flushing the cows with green feed before calving. The old advice to keep the cow on a bare paddock for a few days before calving still holds good.

Take every means of increasing the mineral reserves of the cows prior to calving, using licks containing either dolomite or steamed bone-flour. The addition of cod-liver oil is believed to aid assimilation of calcium. Burnt lime, chalk, or finely ground carbonate of lime should be added in the drinking-water. Lucerne hay or hay containnig a good percentage of cowgrass or clover increases lime content of the diet.

Where numerous cases are occurring a calcium drench should be given to each cow immediately after calving. This should be done in any case with any high producing cows which are known to be susceptible to milk-fever, particularly if they are in high condition or calving rather late in the season.

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Bets were made amongst the shepherds, but we took out the fool implement, and as we all thought wasted our time fixing it to the board. Result: I now own three **"Dux" Tailers,** and my neighbours all want to borrow one when mine are not in use.

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Crops for Wintering Pigs in North Auckland

Trials at Northern Wairoa Demonstration Farm

— By —
E. H. ARNOLD,
Instructor in Agriculture,
Dargaville.

THE dairy farmer endeavours to plan his pig-breeding operations to fit in with the farm pig-feed supplies, i.e., the skim-milk. The number of pigs on the farm from time to time, and consequently feed requirements, cannot always be balanced with the amount of available skim-milk plus that necessary as well as economical but small quantity of purchased meals, especially meatmeal. Frequently during the autumn and winter months when skim-milk supplies are rapidly decreasing and later become practically non-existent, too many pigs are on hand. The reverse often occurs during the spring months when too few pigs are available to cope with the increasing flush of skim-milk.

Uneconomical Proposition

Farmers, therefore, aim to take the first litters to baconer-weights, and to quit the second litters as porkers or even light baconers. Only breeding stock are carried over the winter. Breeding does not always work out "according to Hoyle." The end of the autumn finds unfinished pigs as well as weaners on the farm. If possible, even if a loss results, the unfinished pigs are sold; the younger stores and weaners—difficult types of pigs to quit at that time of the year—are retained over the winter months. Then, unless some suitable feed provision has been made, high priced grains and meals are purchased, resulting in the pigs becoming an uneconomical proposition, even before they are ready to finish-off on skim-milk in the spring.

On the oher hand, the farmer may put his faith in that fickle goddess "Luck," and the pigs be allowed to take their chance. The farmer concerned, hopes that not only will the winter be mild and the spring supply of skim-milk be early, but that the losses through death by starvation will be few. Poorly done wintered pigs will take longer to finish off on skim-milk to baconer-weight than pigs which have been carried through the winter in a thriving condition. If the poorly-done stores have also been subject to disease, due to lack of resistance while under starvation conditions, then such pigs cannot make as economical utilisation of the skim-milk in the spring as do better wintered pigs. The selling off in the autumn of all pigs possible; the wintering of pigs under starvation conditions (which always results in deaths), both necessitate the purchase of costly stores in the spring to avoid wasteful feeding of the increasing skim-milk supplies.

The purchase of meals and grains in large enough quantities to meet the feed demand of many wintered pigs proves uneconomical. Thus, apart from selling or starving the pigs as already mentioned, the only means left is to produce the pig-feed necessary by growing suitable crops on the farm. Crops for such a purpose can be, and have been grown and utilised successfully on many farms in North Auckland.

Selection of Crops

The crop or crops selected must not only be suited to the conditions present on the farm, but also must be capable of being efficiently utilised as a feed by the pig. Then, consideration in selecting the crops must be given to the cash outlay to be found, and the amount of labour—mechanical, horse, and man—required to make the crop successful. The question of the suitability of the crop as a pig-feed is often overlooked. It is of importance to remember that the stomach of the pig is relatively small. As a result of this, the pig thrives best on feed that is not too bulky.

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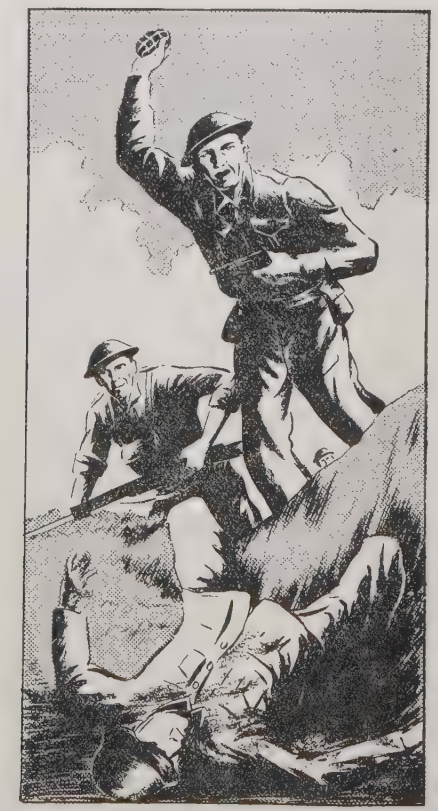
Grain crops make excellent pig-foods, but unfortunately, the common cereals, apart from maize, are unsuitable for growing under the climatic conditions prevailing in North Auckland. Excellent maize crops can be grown on the many suitable areas in Northland. Apart from pumpkins, a crop which does well under similar conditions as those required for maize, other crops to be considered are the root crops. These include sugar-beet, mangolds, carrots, swedes, and artichokes; all of which are bulky feeds. Further, like maize and pumpkins, all root crops are deficient in the vital and necessary proteins. Proteins can be supplied to some extent by grazing pigs on fresh pasture growth, but the best supplement by far is meat-meal in small quantities.

Trial Results

During the 1940-41 season a complete and extensive trial was conducted at the Northern Wairoa Experimental and Demonstration Farm, Dargaville, in an endeavour to gain some information as to which was the most economical crop to grow for wintering store pigs on the farm. The results obtained, although directly applicable to the Demonstration Farm itself, are of extreme value to all farmers considering growing crops for pigs, and in particular to those farmers on the many thousands of acres of river-flat land in North Auckland. Crops of maize, pumpkins, mangolds, carrots, and artichokes were grown for feeding to comparative groups of store pigs during the winter of 1941.

A line of wintered trial pigs leaving the Dargaville Demonstration Farm, after being finished off on spring skimmilk.

Detailed records of all the costs of growing each crop were carefully recorded and are shown in detail in the following tables. In these crop costings, the charges for labour have been standardised at 16s per day for an adult man and 10s per day for a youth. The cost of horse labour was rather difficult to arrive at, but after considering all factors involved—the value of the grazing, the number of days per year on which the horse actually works, etc.—it was fixed at 3s per day. This also includes interest on the value of the horse, depreciation in value of the horse, and interest and depreciation on the harness. After full consideration by the Farm Committee, a figure of £2 per acre has been set as rent for the land. The item, harvesting and feeding to pigs, includes all costs in this connection. The crops under discussion were grown alongside the pig layout and the cost of carting from the



POOR COUNTRY LADS..

Hitler sneered when he said in the early days of the war, "These New Zealanders, these poor country lads." But Rommel knows what country lads are made of; Rommel understands only too well why Churchill named the New Zealand Division "that ball of fire."

Yes, there are plenty of real New Zealand country lads over there, fighting it out on land, flying bombers or riding the slippery, slanting decks of a destroyer. And back here at home their fathers and brothers, wives and mothers are doing double time on the farms . . . playing their part in keeping the armies and the peoples of democracy well fed and fighting fit. They breed them tough in the country.

At International Harvester our job is to do all that's humanly possible for these fighters on the home front, despite the fact that many of our own staff are over there on the hectic side of the earth lending a hand.

But we're still getting shipments of McCormick Deering Tractors, and you can get one tagged for you if you get in early. We still can give you the I.H.C. brand of service, spare parts and repairs to help keep your farm machines plugging away till victory. So when you want help call on your local I.H.C. representative and if you find he's in the forces, as many are, write us direct. We won't let you down.

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We expect to land for next season Harvester Threshers, Mowers, Reapers and Binders, Cream Separators, Pick-up Hay Balers. We are manufacturing Tractor Disc Harrows. Better get your enquiries in now.

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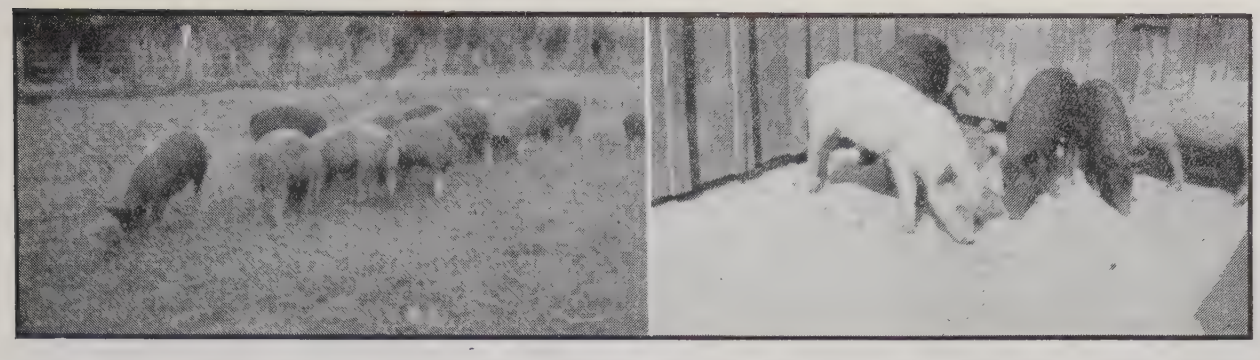

Left.—Pigs which have come through the winter in a thriving condition. *Right.*—Pigs which have wintered poorly.

field to the pigs was therefore at a minimum.

In considering the cost of production of farm-grown crops it should be realised that the main cost is labour, and the work is carried out by the staff necessary for the ordinary farm work. Actually small areas of roots and maize can be produced without increasing the labour costs on the average farm. The following costs must be viewed in this light; they are worked out on a per acre basis and include interest and depreciation on implements:—

THE MAIZE CROP.

	£	s.	d.
Rent of Land	2	0	0
Ploughing	1	14	5
Double discing twice		16	0
Harrowing		3	0
Single discing		4	0
Harrowing		3	0
Clod crushing		3	6
Single discing		4	0
Harrowing		3	0
Sowing seed and fertiliser		10	4
Seed, 14lb.		3	2
Fertiliser, 4cwt. superphosphate		19	6
Horse hoeing		2	9
Thinning and hand hoeing		4	3
Horse hoeing twice		5	6
Harvesting and feeding to pigs	5	5	0
Total	£13	1	5

The cash outlay for seed and fertiliser amounted to £1 2s 8d, while the variety grown was Johannson's White, yielding 90 bushels per acre.

THE PUMPKIN CROP.

	£	s.	d.
Rent of Land	2	0	0
Ploughing	1	14	5
Double discing twice		16	0
Harrowing twice		6	0
Preparing hills, manuring and planting	2	5	0
Seed, 7lb.	2	12	6
Fertiliser, 4cwt. super.		19	6
Hand hoeing and thinning	1	4	0
Horse hoeing twice		7	2
Harvesting and feeding to pigs	8	1	0
Total	£20	5	7

The cash outlay for seed and fertiliser amounted to £3 12s, while the variety grown was Triamble, yielding 18 tons per acre.

THE ARTICHOKE CROP.

	£	s.	d.
Rent of Land	2	0	0
Ploughing	1	14	5
Double discing twice		16	0
Harrowing twice		6	0
Planting	1	10	0
Fertiliser, 4cwt. super.		19	6
Seed, 12cwt.	6	0	0
Horse hoeing		3	7
Total	£13	9	6

The cash outlay for seed and fertiliser amounted to £6 19s 6d, and the crop yielded 15 tons per acre.

THE SUGAR-BEET CROP.

	£	s.	d.
Rent of Land	2	0	0
Ploughing (autumn)	1	11	3
Double discing twice		16	0
Spring ploughing	1	14	5
Double discing twice		16	0
Harrowing three times		9	0
Sowing seed and applying fertiliser	4	8	3
Seed, 14lb.	4	8	6
Fertilisers, 5cwt. lime		5	0
4cwt. super.		19	6
3cwt. 30% potash	2	5	0
1cwt. Nitrate of soda	1	0	0
1½cwt. sulphate of ammonia	1	13	0
Rolling		3	6
Horse hoeing		4	8
Thinning and hand hoeing	16	6	1
Horse hoeing twice		9	4
Hand hoeing	6	10	9
Harvesting and feeding to pigs	9	0	0
Total	£55	0	3

The cash outlay for seed and fertiliser amounted to £10 11s, while the varieties grown were Keane's Danish Strain and Kleinwanzleben, yielding 30 tons of roots and 10 tons of leaves per acre. Both the roots and leaves were fed.

THE MANGOLD CROP.

	£	s.	d.
Rent of Land	2	0	0
Ploughing (autumn)	1	11	3
Double discing twice		16	0
Spring ploughing	1	14	5
Double discing twice		16	0
Harrowing three times		9	0
Sowing seed and applying fertiliser	4	5	0
Seed, 6lb.		18	0
Fertilisers, 5cwt. lime		5	0
3cwt. super.		14	8
1½cwt. blood and bone		15	0
1cwt. 30% potash		15	0
Rolling		3	6
Horse hoeing		4	8
Thinning and hand hoeing	12	4	7
Horse hoeing twice		9	4
Hand hoeing	5	4	6
Harvesting, pitting and feeding to pigs	15	0	0
Total	£48	5	11

The cash outlay for seed and fertiliser amounted to £3 7s 8d, while the varieties grown were Yellow Globe and Long Red, yielding 45 tons per acre. Both varieties were fed in equal proportions.

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EFFECT That POLICY
with the
GOVERNMENT LIFE
TO-DAY

TODAY'S MOOSE FED CALVES make TOMORROW'S HERD
Moose Linseed Oil Cake Meal
The COMPLETE CALF Food

THE CARROT CROP.

	£	s.	d.
Rent of Land	2	0	0
Ploughing (autumn)	1	11	3
Double discing twice		16	0
Spring ploughing	1	14	5
Double discing twice		16	0
Harrowing three times		9	0
Sowing seed and applying fertiliser	4	4	0
Seed, 2lb.		15	0
Fertilisers, 5cwt. lime		5	0
3cwt. super. ..		14	8
2cwt. blood and bone	1	0	0
Rolling		3	6
Horse hoeing		4	8
Thinning and hand hoeing ..	14	5	4
Horse hoeing twice		9	4
Harvesting and feeding to pigs	12	13	4
Total	£42	1	6

The cash outlay for seed and fertiliser amounted to £2 14s 8d, while the varieties grown were Matchless White and White Belgian, yielding 38 tons per acre.

Feeding to Trial Pigs

During the winter of 1941, these crops were fed to six groups of comparable pigs, eight pigs in each group. The pigs were typical farmers' stores, aged ten to eleven weeks, and of the type and weight common in the late autumn in the district.

During a preliminary period of ten days, the pigs were gradually changed over to their trial rations. During this period and for a week afterwards the pigs receiving the root crops, mangolds, carrots, sugar-beet, and artichokes were subject to some slight scouring and digestive troubles which soon cleared up. In addition to receiving the particular crop being fed to that group, each pig received half a pound of meatmeal per day.

Maize and pumpkins. Two suitable crops for producing winter feed for pigs in North Auckland.

In previous years, a considerable amount of investigational work has been carried out on the Demonstration Farm in connection with maize feeding of winter stores, and the maize group was fed a ration so that the pigs would come through the winter in a thriving condition. Pigs making an average gain of half a pound liveweight per day over the winter months, can be said to have thrived. The other crops were fed to appetite and the amounts consumed by each group carefully recorded.

Since this trial was performed, research work at the Animal Research Station, Ruakura, has shown that the rationing of roots according to their feed value results in more thorough utilisation of the nutrients in the roots, and avoids wastage. All pigs were weighed at regular fortnightly intervals. All groups were provided with good housing—an essential for wintering pigs—and at all times had free access to good ryegrass areas, one-third of an acre to each group. Pasture growth has been shown to be of value to store pigs, not only as a tonic, but also as a source of feed.

GREATER PRODUCTION POSSIBLE with

R. & G. Tractor Tandem Disc HARROW

Exclusive Features:

Pressure Bars are of spring steel and the **Gang Bars** are double angle steel to prevent misalignment. Easily accessible latest high-pressure or cup **lubrication** in all **bearings,** which are dust-proof. Blades: Best Sheffield Steel tested for extra hardness. Rear set of discs follow contours of front set despite sharp turns. Both sets are controlled simultaneously.

Your land will produce greater and better crops if it is properly opened up with an R. & G. Disc Harrow to allow the entry of oxygen from the air and for the action of sun and moisture to revitalise it. The R. & G. Tractor Tandem Disc Harrow is built in New Zealand for New Zealand conditions, of extra toughened high-tensile steel—strongly constructed—fully equipped with high quality blades and pressure grease points.

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The following table gives summarised details of the gains in weight and the feed consumed by each group of pigs over the trial period.

Group	Liveweight per pig		Increases per pig		Feed consumed per pig				Feed per 100lb. Liveweight gain	
					Meatmeal		Crop			
	22/5/41	14/8/41	Total	per day	Total	per day	Total	per day	Meatmeal	Crop
	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
Maize	42.7	80.4	37.7	.45	42	.5	110	1.3	111	292
Pumpkins	41.7	89.5	47.8	.57	42	.5	1002	11.9	88	2096
Sugarbeet	42.7	80.7	38.0	.45	42	.5	1135	13.5	111	2987
Carrots	43.8	74.8	31.0	.37	42	.5	1298	15.5	136	4187
Artichokes	42.0	60.0	18.0	.21	42	.5	1116	13.3	233	6200
Mangolds	45.4	68.8	23.4	.28	42	.5	1463	17.4	179	6252

Two important facts are now clearly presented:—

1. The increases in liveweight per pig per day show that of the six crops fed to the trial pigs, only three, maize, pumpkins, and sugar-beet, along with the ration of meatmeal, carried the pigs through the winter in what is generally recognised as a thriving condition. Although the pigs in the other groups did not do as well, they made sufficient increases to indicate that the rate of growth during the winter period was sufficient to keep the pigs alive and make some increase. Such pigs were quite suitable to finish off on skim-milk in the spring.

2. Where a crop was efficiently utilised by the wintering pigs, the amount of crop fed to produce 100lb. increase in liveweight was less than where the crop proved less suitable as a pig feed. In addition, where the crop was a more suitable food, then the pigs more efficiently utilised the meatmeal fed, and required less meatmeal to produce a 100lb increase in liveweight.

Financial Considerations

The fact that certain crops can be efficiently utilised by wintering pigs does not always result in the growing of such crops becoming a payable proposition. The most expensive item in production is labour, and many farms could produce small areas of roots and maize without increasing the total farm labour bill. Further, the best crop for feeding to pigs may cost more than a crop less efficient as a pig food. Efficient utilisation must therefore be considered along with costs as is done in the following table:—

Crop Group	Cost of feed per pig			Value of pig 22/5/41	Cost of pig to winter	Value of pig 14/8/41	Amount saved by wintering on each crop
	Meatmeal X	Crop	Total	Y		Z	
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Maize	6 2	5 8	11 10	10 0	21 10	42 6	20 8
Pumpkins	6 2	10 1	16 3	10 0	26 3	47 6	21 3
Sugarbeet	6 2	13 11	20 1	10 0	30 1	42 6	12 5
Carrots	6 2	12 10	19 0	10 0	29 0	40 0	11 0
Artichokes	6 2	8 9	14 11	10 0	24 11	35 0	10 1
Mangolds	6 2	14 0	20 2	10 0	30 2	37 6	7 4

X. Meatmeal cost 15/- per cwt. to purchase and feed to the pigs.

Y and Z. Values fixed after consultation between Farm Committee, representative dairy farmers and stock buyers.

It therefore proved more profitable not to quit any of these pigs in May and purchase others in the spring. Certainly, some crops, especially maize and pumpkins, are far more profitable than the root crops. On certain farms it is not possible to grow either of these two crops successfully, but it will, on many farms, be possible to grow economically one of the root crops. On such farms it is therefore profitable to grow any of the suitable crops rather than sell off in the autumn and to purchase in the spring.

Farmers are entitled to the assistance and advice of the District Pig Council Supervisors. Pig producers have provided the funds to enable these Councils to be set up, and all farmers are urged to take every advantage of these facilities. Applications for assistance should be made to the Department of Agriculture or to District Supervisors as follows:—Whangarei (Box 131); Pukekohe (Box 32); Whakatane (Box 12); Gisborne (Box 316); New Plymouth (Box 131); Palmerston North (Box 80); Dunedin (Box 693); Christchurch (Box 639); Hamilton, care Department of Agriculture.

It is not only of pecuniary advantage to the farmer to winter his store pigs on farm-grown crops and meatmeal, but it is good pig husbandry to raise his own well-bred pigs to baconer weight, and also avoid the introduction of disease, a risk taken whenever store pigs are purchased.

Today, more so than previously, it is a national duty that all potential bacon be produced to satisfy increasing demands. This winter (1943) every farmer is well aware of the position regarding bacon production. Will next winter be any better? The importation of grain is not the solution to the pig feeders' problem; the production of farm-produced feeds is the only solution. Now is the time to plan for next winter.

Half an acre of a suitable root crop or pumpkins, or an acre of maize will provide sufficient winter food for pigs on a sixty-cow dairy farm. Certain crops are, of course, more profitable than others. The results of the Northern Wairoa trials are a definite guide to all those farmers on the riverflats of North Auckland.

On farms on different soil types, the economical values of each particular crop will be different: but the fact remains that there is a definite case for due and careful consideration to be given to the growing of crops on the farm for wintering store pigs. In a later article, the various problems associated with the successful growing of these crops will be dealt with in detail.

Curing of Pigs for Farm Consumption

AS there appears to be some doubt as to the position in respect to the curing of pigs on behalf of farmers for their own household consumption, the Food and Rationing Controller, Mr. J. E. Thomas, advises that full instructions covering this particular class of trade have been issued to all licensed bacon curers who will be pleased to advise farmers regarding their obligations under the scheme. Briefly, these are as follows:—

1. There are no restrictions on a farmer who desires to kill pigs on his own farm and himself cure the carcase for his own household use.

2. Where a farmer instructs a licensed curer to cure pigs on his behalf, he must fill in a special form, B3, which must be delivered to the curer concerned. (The necessary application forms are obtainable from all licensed bacon curers, the various branches of the Farmers' Union, and from the Office of the Food and Rationing Controller, Wellington). The quantity of bacon that any one farmer may have cured in this way must not exceed 75 per cent. of the quantity similarly cured for his own household use during the year ended May 31, 1943. All bacon and ham cured in this way will be branded by the curer, "Not for Sale."

3. A prohibition has been placed on the curing of pigs by farmers for sale or disposal to country storekeepers or other distributors or consumers. Storekeepers affected by this arrangement will in future draw their supplies only from licensed curers whose quota will be amended to cater for this particular class of trade.

PEAS AND GUNS

Peas have gone to war—our fighters, our Allies, our civilian population in New Zealand and the Empire overseas, all are calling for more and more of this important protein food. Help feed the men behind the guns—they need peas canned and dried.

CONTRACT PEA GROWERS WANTED

Mainly for Greenfeast and Prussian Blue types. Arthur Yates and Co., Ltd., have been entrusted to supply a large proportion of the requirements of Australia and England—grow with security with New Zealand's leading seed growers—highest rate—prompt payout—a fair deal from start to finish.

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Poverty Bay: Common Shelton, Gisborne; Williams and Kettle, Gisborne.

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Marlborough: A. Yates and Co. Branch Office, (J. Bourke, Rep.) Blenheim.

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Conservation of Farm Machinery

Care of Rubber Tyres

USE of proper air pressure is the most important factor in the satisfactory performance and maintenance of tractor and implement tyres. Both under-inflation and over-inflation are harmful.

UNDER-INFLATION

Under-inflation causes a series of diagonal breaks in the sidewall area, usually on the inner sidewall of the furrow wheel tyre caused by repeated buckling of the sidewall. When under-inflated, the tyre may slip on the rim, tearing off the valve stem.

Under-inflated implement tyres are exposed to similar injuries, plus the danger of excessive pressure building up and bursting the tyre.

OVER-INFLATION

Over-inflation reduces traction, causing excessive slippage and resulting in more rapid tread wear.

Tractors are shipped from the factory with very high air pressure in the tyres to prevent turning and scuffing during shipment. The air pressure should be reduced to the recommended pressure before tractor is unloaded.

Tractor tyres in storage should be kept inflated at recommended operating pressure.

In all ploughing operations the inflation in the furrow tyre should be increased by 4 pounds over regular inflation.

Implement tyres are often over-inflated to a serious degree to take care of excessive overload and fail beyond possible repair. Follow the implement tyre recommended pressures at all times.

TRACTOR TYRE INFLATION.

Front—All sizes:

1. 4-ply tyres ..... 28 lb.
2. 6-ply tyres ..... 36 lb.

Rear—All sizes:

3. Minimum inflation pressure 12 lb
4. When ploughing, increase pressure in tyre on furrow wheel by 4 lb.
5. When special heavy wheels are used, or heavy loads are carried on the tractor, inflation pressure must be increased. Further information on inflation pressures can be obtained from the tractor or tyre manufacturer.

Check Air Pressures every 2 to 3 Weeks.—Use low pressure gauge checked occasionally for accuracy. Always use a valve cap to prevent loss of air.

METHODS OF INFLATION.

A hand pump is not difficult to use when only a few pounds are needed. A power take-off pump attached to the power take-off, or a spark plug pump which operates by removing spark plug and inserting pump, are both satisfactory. (Do not use spark plug pump with diesel engine.)

TRACTION AND EXTRA WEIGHT.

Tests show that traction or pulling power is in direct proportion to the weight carried. Extra weight is needed only for heavy pulling; not for such work as planting, harrowing, or cultivating, or when heavy equipment is mounted on the tractor.

TABLE A—Relation of extra weight to extra traction

150lb. weights on Rear Wheels	Pounds Drawbar Pull: On ploughed Ground	On Sod
None	1600	3000
1. Weights per wheel	1725	3200
2. Weights per wheel	1850	3400
3. Weights per wheel	1975	3600

Added wheel weights increase traction.

TABLE B—Relation of surface to drawbar pull.

Drawbar Pull per 100lb. Weight on Rear Wheels. (50lb. on each wheel).

	High	Low	Average
Concrete Road ..	.75	.57	.66
Dry Clay	.62	.49	.55
Sandy Loam	.58	.48	.50
Dry Sand	.42	.29	.36
Lucerne	.41	.31	.36

Figures represent the pounds pull for each 100 lb. weight on the rear

Acknowledgement

The illustrations and material for this article have been made available through the courtesy of the Goodyear Tyre and Rubber Co., Ltd.

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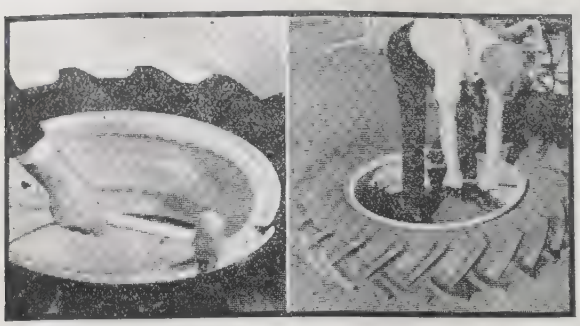
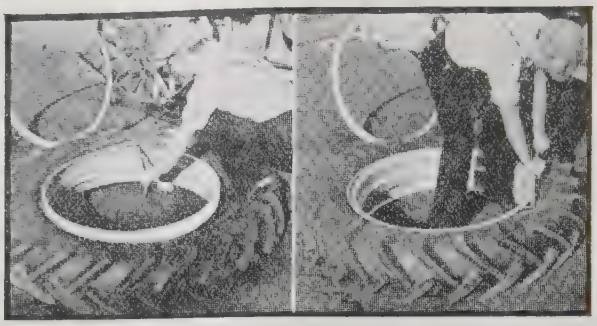
Rich . . . . . In Fat
High . . . . . In Protein
Low . . . . . In Price

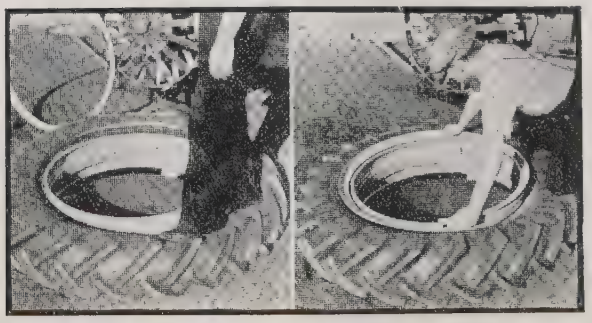
How to Remove Tyres From Semi-drop Centre Rims

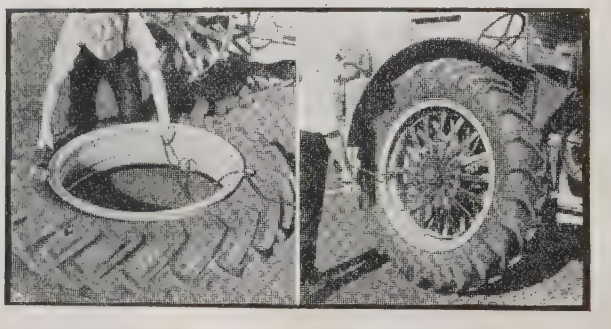




1.—First remove rim from wheel. Strike side ring with hammer near split to drive tyre bead off its seat. If bead is rusted to rim it may be necessary to use tyre tool as shown in photograph on extreme right. *2.*—Use tyre tool to remove rim ring. Insert in the notch and pry off. *3.*—Place four-inch block under the tyre (not under the rim) at the valve side. Step on tyre at valve and force tyre bead into gutter. Insert tool under tyre bead near valve and work off outer bead. Force part of inner bead into gutter and complete removal of tyre. *4.*—Turn tyre and rim assembly over. Insert tool between rim flange and tyre and work off bead seat.

How to Apply Tyres on Semi-drop Centre Rims.





1.—After removing ring, place tyre on rim. Beginning at the point opposite valve, step on tyre and force inner bead down into gutter. Then walk the outer bead into place. *2.*—Start rim ring with hands. Place the driver of ring next to slot in base. Walk rim ring on. Insert tyre tool in the slot at split and force into place. *3.*—Inflate the tyre partially. Tap rim ring gently to ensure proper seating. Then complete inflation. *4.*—Mount tyre and rim on wheel. Keep wheel at same level as rim so it will not be necessary to lift tyre and rim.

tyres of tractor, i.e., if each rear wheel carries 1000 lb. (total 2000 lb. on rear axle) then in dry clay average pull would be 55 lb. per 100 lb. or total of 1100 lb. drawbar pull.

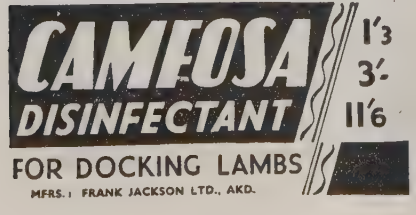
Table B shows that it is necessary to have more weight on rear tyres for sand and lucerne than for other conditions.

For the best efficiency you should determine the weight to use on driving wheels. Some slippage is normal but should not exceed 16 per cent. for efficient field operation and 5 per cent. on pavement.

From table B note that in sandy soil drawbar pull is increased by an average of 36 lb. for every 100 lb. weight added to rear wheels.

Additional drawbar power can be obtained by adding the weight up to the maximum carrying capacity of the tyres. If the weight required for adequate traction exceeds the recommended carrying capacity of present tyres, oversize tyres should be used. Air pressures should then be adjusted to take care of additional weight.

Addition of weight may be provided by bolting cast iron weights to the wheels. Use of liquid in tyres is less expensive and less difficult to handle with no objectionable operating effects at tractor speeds up to 25 miles per hour. If very heavy weight is required both water and cast iron can be used. Your tractor or tyre dealer will suggest methods for applying or removing different weights.

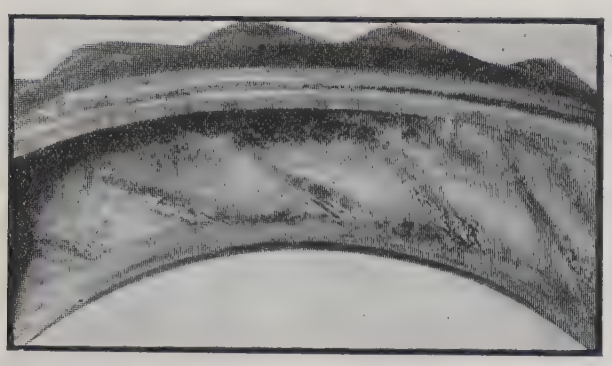


IMPLEMENT TYRE INFLATION DATA*.

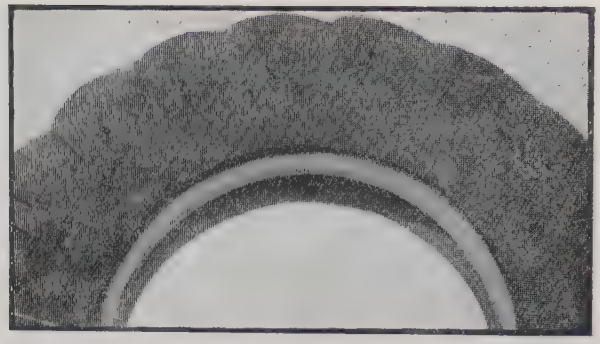
Tyre Size All Rim Diam	4 ply	6 ply	8 ply	10 ply
3.50	40	..	..	..
4.00	36	48	..	..
5.00, 5.50 ..	32	44	..	..
6.00, 6.50, 7.00	28	40	56	..
7.50, 8.25 ..	24	36	48	..
9.00	20	32	44	56
11.25	..	28	36	44
12.75	..	24	32	..

*Applies to all except 2-ply tyres.

Proper Pressure for Mounting Tyres.—After mounting the rear tyres inflate to 30 lb. air pressure to force beads firmly on to the rims. The tyre should be inflated to 30 lb. air pres-



Inside appearance of buckle or furrow break.



Outside appearance of buckle or furrow break.

sure every time the tyre bead is pushed away from the rim seat at any point. Then completely deflate to allow tube to take its natural position. Re-inflate to recommended pressure. If this procedure is not followed, the tyre will slip and shear off the valve stem.

Effect of Air Pressure on Traction.— Tyres should not be operated below minimum air pressures shown in the table. For more traction, use additional weight. Under-inflation makes little difference in traction and ruins tyres. With oversize tyres continue to use recommended inflation and increase traction by the use of additional weight.

FOR BELT WORK.

When a rubber-tyred tractor is operated on belt work, static electricity may be developed, and if not grounded, may be dangerous. Ground the machine by having a chain, wire, or rod connect the metal framework to the ground.

On tractors with wide front wheels there is danger of the belt cutting the front tyre. This can be prevented.

1. If the left front wheel is raised on a block, the top of the right wheel will be tilted outward away from the belt.

2. A hole may be dug in the ground to lower the right front wheel below the belt.

3. Stakes or iron rods may be used to prevent belt from swaying.

4. A piece of sheet iron can be bent to fit over the tyre as a shield.

Avoid Tyre Damage

Some types of service, as, for example, in disc or mouldboard ploughing where the right tyre runs in the furrow and is distorted by the tilt of the tractor, the sidewall is subjected to severe folding pressure when the tyre is not properly inflated. The tilt of the tractor causes sidewall thrust which, combined with heavy pull of the plough, causes the inner sidewall of the tyre to buckle. This continuous folding or buckling causes cord separation and a series of breaks which cause failure of the tube by chafing.

Increase pressure in the tyre on the furrow wheel by 4 lb. and adjust the plough hitch laterally so that tyre does not crowd the furrow wall in order to plough full width cut.

Watch your

AIR PRESSURE

...and your tyres will live longer!

• The average motorist loses 25% to 35% of his tyres' life through underinflation — which weakens the sidewalls of a tyre.

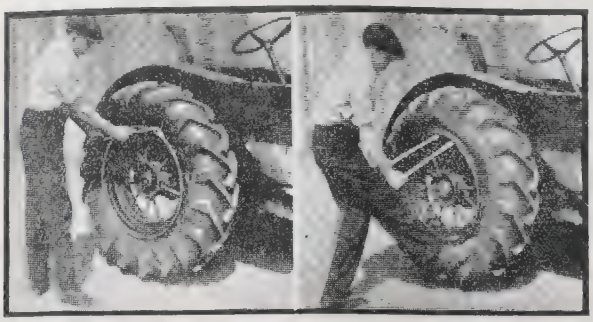
Overinflation causes excessive wear in the center of the tread.

Your Goodyear Dealer will be glad to tell you the exact air pressure your tyres should carry.

Have him test your air pressure regularly — and get longer mileage from your tyres!

GOODYEAR TYRES

How to Remove Tyres From Drop Centre Rims.



1.—Deflate completely by removing valve inside. Force outside bead off seat by prying from rim flanges. Use tyre iron and go completely around the tyre forcing it towards the centre. Repeat on inside bead. If the tyre has been mounted for some time it may be necessary to use two 12-inch iron C clamps. *2.*—Lock wheel by putting tractor into gear with valve at top. Force bead at bottom into gutter. Insert tyre iron and pry bead over rim flange. Avoid extremely hard prying as it is possible to damage tyre bead. *3.*—Pull tube out of casing. When tube is punctured, it can be removed, repaired and replaced in casing without removing tyre completely from the wheel. In this case, thoroughly inspect inside of casing for nails, glass or any injuries before reinserting tube. *4.*—To remove tyre completely from wheel, insert tyre iron under bead and pry tyre off wheel. Be sure that bottom part of bead and opposite side is down in the gutter of rim.

How to Apply Tyres on Drop Centre Rims.

1.—Lock wheel of tractor after placing valve hole at bottom. Place tube in casing so valve will face valve hole with tyre revolving in right direction. Lift tyre up on wheel and place inner bead over outer flange and down into rim gutter. *2.*—With two tyre irons pry remainder of inner bead over rim flange. Take small bites to make prying easy. Then pull valve through hole and hold in place with a conical cup. *3.*—Lift outer bead up and over rim flange and down into rim gutter. Then proceed to pry remainder of bead over flange. *4.*—After bead is started, hold top part of bead in rim well with one tool and pry bead over rim flange with the other. Then inflate, making sure that beads are seated properly on rim flange. Inflate to 30 pounds air pressure to seat tyre beads. Then completely deflate to allow tube to take its natural position, and reinflate to recommended air pressure.

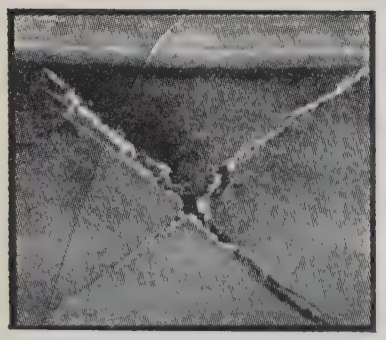
Bruise or Impact Breaks are caused by hitting some object. Cords rupture easily if drawn tight by excessive pressure. Force is greater if impact is at high speed. The use of extra ply tyres, adjustment of pressures to recommendations, and greater care in driving will decrease the impact break hazard.

Weather Checking.—Tyres inflated to excessively high pressure and tyres exposed to sunlight, draughts, or electrical discharges develop small checks. Painting of tyres with common paints, varnishes, or lacquers may also cause this condition. Unless these checks develop into flexing or radial cracks the condition is not serious. Adjustment of air pressure and protection from the elements will prevent this condition. Even a good coating of mud on tyres is helpful.

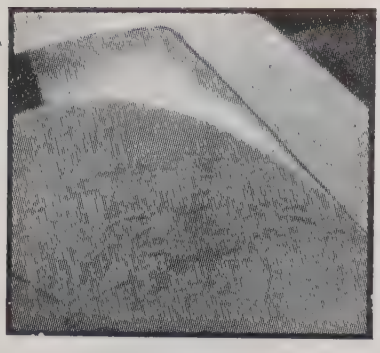
Tread and Sidewall Cuts.—Rubber cuts more easily when wet. Cuts should be repaired as soon as possible to stop localised flexing and fabric decay. Attend to repairs at once, major damage can often be avoided by care and attention at the right time.

Tread Wear and Cutting Due to Spinning.—Tractor tyres with insufficient weights or excessive inflation will wear tread bars rough, or will snag and cut the bars when subjected to severe service on abrasive surfaces. Sudden engagement of the clutch causes this type of wear. Addition of wheel weights, adjustment of air pressure to meet recommendations, decreasing draft load and proper operation will remedy this condition.

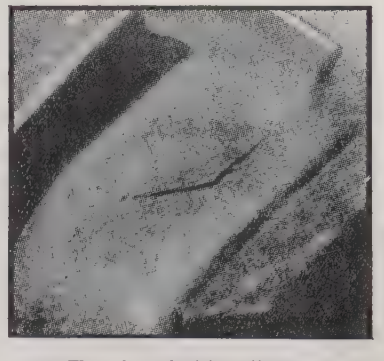
Fast Wear due to Wiping on Hard Road Surfaces.—On hard roads with low air pressure there is an undesirable distortion of the tyre during which the tread bars shift while going under and coming out from under the load. On hard surface this wipes off the rubber of the tread bars or lugs. This wear takes place on the back of



Bruise or impact breaks.



Weather checking.



Tread and sidewall cuts.

the lugs in contrast to wear on the front of the lugs caused by slipping.

If tyres are to operate on roadways or other hard surface for any length of time, and draft load is not great, increase the air pressure to maximum recommendation.

Sidewall Wear—Scuffing Front Tyres.—This condition is encountered mainly on front tyres. On wide front type tractors it is generally caused in ploughing by riding the front right or furrow tyre against the side of the unploughed land. On dual front cultivating type tractors in irrigated areas, or in heavy soil sections where planting is upon beds, the dual front tyres scuff against the sides of the beds. Front tyres operating in ruts soon wear off the thin sidewall against the sides of the ruts. (Note illustration.)

A much larger proportion of the tread volume is in the shoulder or upper sidewall region of the multi-rib or triple-rib front tractor tyre and this tyre is recommended wherever sidewall scuffing of front tyres is encountered.

Proper setting of ploughs so that they will cut full width without riding against the furrow wall will correct this condition on wide front tractors.

Damaged Rubber Valves.—When valves are torn off tubes, it indicates a slippage of the tyre bead on the rim or an improper centring of the valve in the hole of the rim.

Slippage may be caused by (1) low air pressure, (2) improper seating of the bead on the rim, (3) use of soap solution on bead or rim when mounting tyre.

When this occurs demount tyres and clean rims and wheels carefully. Mount tyre and inflate to 30 lb., then deflate completely, allowing tube to take natural position, then re-inflate to recommended air pressure.

Chains.—Several tyres are available for wet grass and slippery ice conditions. For severe muddy ground conditions, lug-type chains are used. Flexing of the tyre and creeping action of the chain will break the mud loose as the wheel rotates, giving traction equal to spade lug wheels.

Protection of Tyres.—Although the tread and sidewall rubber of tractor and implement tyres is compounded to resist action of sunlight, it is advisable to keep tractor under cover and jacked up when not in use over a long period of time. When put back in service inflate tyres to correct pressure.

Do not allow tyres to come in contact with grease or oil, as both destroy rubber. After using tractor for spraying; wash off any chemicals that may have dropped on the tyres.

Tyre Repairs.—Inspect tyres occasionally for possible injuries.

Sidewall or Tread Rubber Cut through Exposing Fabric.—Wash out cut with benzine and fill with tread cut repair gum to prevent moisture and dirt from working into the fabric and damaging it.

Puncture.—If tyre is punctured by a large nail a rubber repair plug should be inserted from the inside.

Cuts.—Cuts from running over something sharp or breaks in the cord body by hitting obstructions can be repaired temporarily. Clean fabric inside of

Tread wear and cutting due to spinning.

Fast wear due to wiping on hard road surfaces.

Sidewall wear—scuffing front tyres.

the tyre. Coat with cold patching cement and allow to dry thoroughly, then install a cemented cold patch large enough to cover 3 in. to 4 in. surface in all directions around injury. Fill in outside with tread cut repair gum to prevent dirt and moisture working into the tyre. This is temporary. As soon as convenient remove the tyre and have it vulcanised permanently.

Truck Tyres

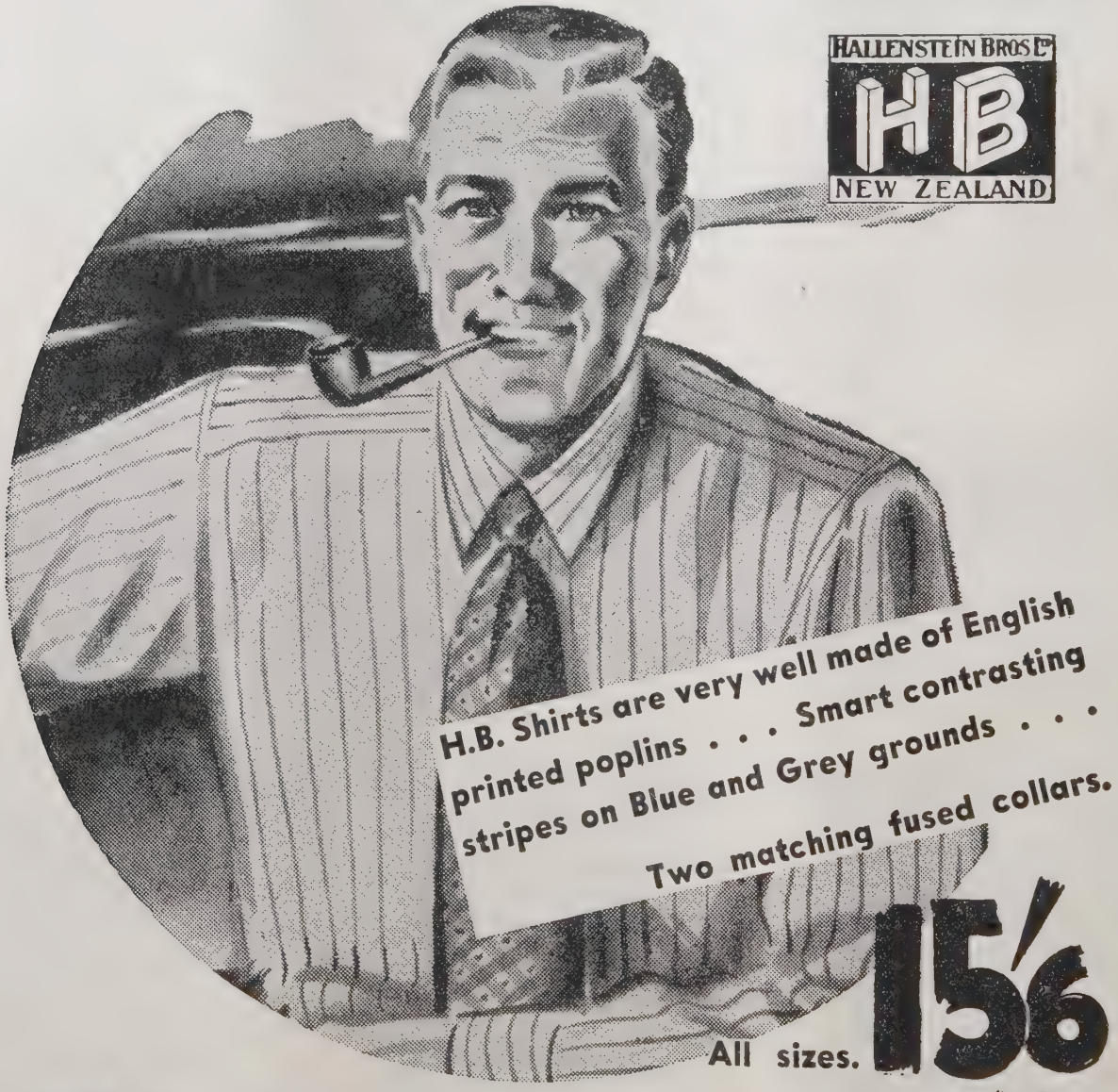
Special Points for Extending Truck Tyre Mileage:—

If possible, change over to wide-base rims.—Tyres give better service on rims larger than the generally recognised as "standard" sizes. For greater mileage change over to rims one size wider than normal. (Also—rusty rims damage tyre beads. Clean rims with wire brush. Do not use oil or grease.)

Take extra care in hot weather.—An increase in temperature from 75 deg. to 85 deg. will result in 13 per cent. less tread wear. Slower driving and more frequent stop-overs will counteract this heating action.

Match duals properly.—In no case should tyres differing more than ¼ in. in diameter be placed on the same dual assembly.

Watch for axle sag.—A sagging axle forces the inside tyre of a dual as-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sembly to carry more than its share of the load, resulting in fast, irregular tyre wear on the inside shoulder of the inside dual.

HOW TO MAKE TYRES LAST LONGER.

Tyre saving rules that apply to **both** car and truck tyres.

Drive at slower speeds.—Your tyres will run with less slippage, thus reducing tyre-wearing friction (e.g.—By reducing speed from 50 to 35 m.p.h. tyre life is increased 33 per cent.)

Check tyre pressures regularly.—Too little pressure pulls the cords loose. It also causes irregular tread wear; too much pressure wears out the centre of the bulged tread and leads to broken cords. Be sure to check air pressures with an accurate hand gauge.

Check brakes and wheel alignment.—Unequally adjusted brakes cause one tyre to grip more than the others and wearing it out more rapidly. A wheel only ½ in. out of alignment drags a tyre sideways 87 feet in every mile, grinding off the tread and causing irregular wear.

Rotate tyres.—To equalise wear on passenger tyres, change wheel position of your tyres every 2000 or 3000 miles as follows:—Spare to right rear, right rear to left front, left front to left rear, left rear to right front, right front to spare.

Keep caps on valve stems.—Valve caps keep out dirt and prevent slow leaks.

Have tyres retreaded in time.—Smooth tyres with sound bodies may have new treads applied and so give many more miles of economical service. Truck tyres should be removed for retreading with a minimum of 1-8th of an inch of original tread remaining on the centres. Car tyres should be retreaded before the tread design becomes bald. These rules, of course, apply only to those eligible for retreading services.

Have your tyres examined for cuts and bruises.—Small cuts collect abrasive dirt, small stones, and tyre-killing dampness, causing ply separation and eventual complete tyre failure. Bumping into curbs or hitting stones may cause inside fabric breaks without outward sign.

Do not overload tyres.—Overloading causes fast wear because the load per square inch of contact area is increased; 10 per cent. overloading decreases tyre life 18 per cent; 20 per cent. overloading decreases it 30 per cent.

Have tyres mounted by a tyre expert.—Mounting tyres improperly may cause premature failure . . . the tube can be chafed, pinched, creased, or the valve can be pinched out.

You can practise many of the suggestions in this article yourself but others must be performed by competent tyre specialists. Remember—it is your duty to save rubber yet keep your car and truck on the road as long as possible.

Overloading Tractors

THE life of any tractor is to a large extent governed by the attention paid to the manufacturer's instructions when the machine is put into operation. Every time the operator of a farm tractor places a heavier load on it than is recommended he is shortening its life and inviting mechanical troubles.

A farm tractor when delivered into the farmer's hands is recommended to pull certain loads with a reserve of power. Overloading imposes undue stress on the engine bearings, thus causing extra friction, overheating, and scoring of the metal. Valves and valve guides are also subjected to more heat with a consequent burning of valve seats, warping of valve stems, and worn valve guides.

The engine oil also breaks down faster under overloading, and its lubricating quality is therefore impaired, thus causing general excessive wear to all parts of the engine.

Although very little trouble is experienced with tractor transmissions, it can be assumed that transmission life must be shortened by giving transmission gears and bearings heavier loads than they were originally designed to carry. The vibration or drag on the transmission gears when the tractor is overloaded can usually be felt by the operator through the frame of the tractor.

Also of importance is the wear on rubber tyres caused through overloading. In order to develop a certain drawbar pounds pull, the tractor is built with a weight and balance so that the recommended load can be drawn with the least amount of wheel slippage. With the urgent need for the conservation of rubber, particular attention should be paid to overloading, as wheel slippage caused through this practice greatly increases the wear on tyres.

Supplies of new tractors are limited, and it is therefore in the best interests of the country and the tractor owner, that full attention be given to these recommendations. By pulling an overload the tractor owner may think he is gaining something, but in the final analysis it will prove otherwise, as the extra work gained will be offset by the extra maintenance cost, and also loss of time while the tractor is in the workshop for repairs, the breakdown occurring perhaps when the tractor is most needed on the farm.

Acknowledgements

The material for the above article and "The Farm Tractor" in the June issue of the Journal has been made available through the courtesy of the Massey-Harris Co., Ltd.

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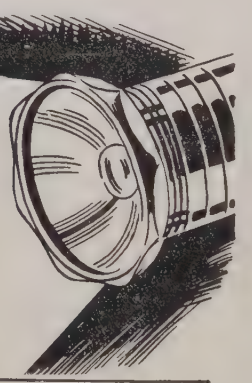
The Department acknowledges the assistance of the Lister Separator Co., (N.Z.) Ltd., who supplied the material for the article "The Cream Separator" featured in the June issue of the Journal.



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OIL FUEL ON THE FARM

The types of engines in use in farm equipment fall into the following four groups:—

1. Compression ignition or diesel engines.

2. Spark ignition (commonly called petrol engines).

3. Hot bulb ignition semi-diesel engines.

4. Spark ignition semi-diesel engines on the Hesselman system.

The hot bulb ignition engines are not made nowadays and as they are of very simple and rugged construction, it is not proposed to comment on them in detail.

The fourth class of engine using the Hesselman system is a later type not yet used in great numbers. As far as principles of operation and maintenance are concerned, it can be considered as a combination of the full diesel and the spark ignition type.

Types of Fuel

The fundamental difference in the principles of operation of the compression ignition and the spark ignition types is reflected in the characteristics of the fuels used. The former operates in this country on diesel fuel (also known as industrial diesel) and light diesel fuel (also known as automotive diesel).

The light diesel is, of course, the more expensive grade. The spark ignition engines operate on power kerosene or motor spirit with, of course, motor spirit the more expensive grade. As regards the other types, the hot bulb semi-diesel often operates on lighting kerosene for the small sizes and light diesel fuel or diesel for others. The Hesselman type of engine runs on light diesel fuel.

In the compression ignition or diesel engine the fuel is sprayed under pressure as high as 2400 pounds per square inch directly into the combustion chamber at the top of the compression stroke, and the compression pressure is sufficiently high for the fuel to ignite spontaneously due to the high temperature of the compressed air. On the spark ignition type the fuel is vaporised and mixed with air in the correct ratio for efficient combustion by being drawn from a fine jet into the air stream. Evaporation of the atomised fuel is assisted by heating of the mixture during its passage into the combustion chamber. At the top of the compression stroke the mixture is fired by means of an electric spark.

On both engines, the higher the compression ratio the more efficient is the combustion and thus more of the heat available in the fuel is converted into power. On the other hand, the compression ratio and compression pressure are limited. In the diesel engine the limit is the high firing pressures developed which necessitate increasing the strength of the engine parts and the average compression ratio in this type of engine ranges from 12-1 to 20-1. On the petrol engine, the compression ratio that can be used is considerably lower and ranges in general from 4½-1 to 6-1, because, due to the different type of ignition, under high pressures, the fuel combustion becomes uncontrolled, leading to "knocking" with consequent burning of valves and other internal parts, and loss of power.

The essential fuel characteristic for a diesel engine is, therefore, that it shall give clean burning and easy ignition. The light diesel fuel, being the better quality grade, is better in this respect and must be used on the small high-speed diesel engines, whereas the heavier grade is a cheaper quality, suitable for large and slower speed engines.

Acknowledgement

The information in this article has been provided by the Shell Oil Company of N.Z. Ltd., Technical Division.

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For the spark ignition engine, on the other hand, the characteristics required are that it shall vaporise easily, and that it shall have a high resistance to knocking. The more expensive of the two grades available for these engines, i.e., motor spirit as against power kerosene, is better in both these characteristics and will, therefore, always give the better results in a spark ignition engine. However, a great many spark ignition engines are designed specifically to operate on power kerosene, but this applies more particularly to the older models.

The newer models of engines, particularly in the case of tractors, will give greatly enhanced performance in every way by using motor spirit. More power without knocking, a cleaner engine with less dilution of the lubricating oil, less wear, easier starting, and very much better warming up will be obtained. With many of the modern tractors it is not intended to operate on anything at all but motor spirit, because, in this case, the engine may then be designed to obtain appreciably more power than if expected to digest power kerosene as an alternative.

Engine Efficiency

The practical owner and engine operator will be interested, at the present time particularly, in any measures that will enable the economy of the engine to be increased, and some of the main points which will easily repay attention are outlined below.

The first point is to eliminate all leaks in the fuel system. Although this appears very obvious, nevertheless, it is not realised what substantial quantities of fuel are wasted by even a small leak. This is because, particularly in the case of motor spirit, the fuel may evaporate after leaking or the fuel drops may not be noticed as they drop on to the grass or loose ground. Close attention to all joints where fuel may be leaking will be amply repaid.

The next measure requiring attention is to make certain that, when the fuel reaches the combustion chamber, the burning is taking place fully and efficiently, and this can be ensured by:—

1. Correct adjustment of all the various engine settings which are detailed later on.

2. Proper maintenance of the whole of the power plant.

3. Maintaining the engine at an efficient working temperature.

Regarding the third item, it is not often realised how much the running of the engine is improved by ensuring that it is thoroughly warmed up. Not only is combustion of the fuel improved in all types of engines, but also the lubricating oil is warmed up thoroughly so that full and complete circulation is obtained and, at the same time, the drag and frictional loss of thick oil is avoided.

In the spark ignition engine vaporisation of the fuel is greatly improved. leading to greatly reduced dilution of the lubricating oil, and less use of the choke with its consequent fuel wastage. In the diesel engine, the thoroughness of burning of the fuel is increased so that carbon deposits in the combustion chamber and on valves and pistons, etc., are reduced to a minimum.

In a water-cooled engine, provided the water circulation system is completely full, there is no harm whatever caused if the water actually boils. However, owing to the danger of the water boiling away while the engine is unattended, when damage is then caused through overheating, it is desirable to run with a slight margin of heat in hand to cover minor fluctuations in temperature. The best all-round radiator temperature is approximately 180 degrees Fahrenheit.

Adjustments

With regard to correct adjustments. the points particularly repaying attention on the spark ignition engine are as follows:—

1. Keep the carburettor thoroughly clean with all jets clear, the float mechanism working correctly, and the needle valve seating correctly without allowing flooding. The

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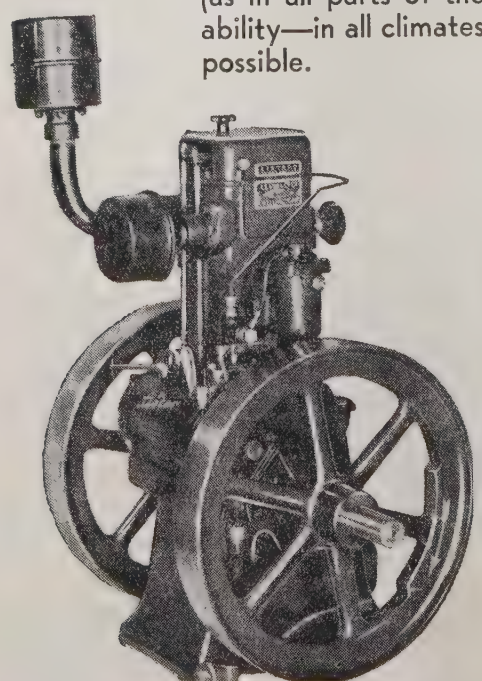

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actual carburetter setting should be adjusted by the engine maker's servicing staff wherever possible, and care taken not to depart from this.

2. Ensure the absence of air leaks in any part of the induction system, such as the joint between the carburettor and induction pipe and other such flanges.

3. Clean and set spark plugs, the correct gap usually being .020/.025in.

4. High tension ignition leads to be kept in good condition and free of oil and dirt. Loose or makeshift connections should not be tolerated, and careful examination occasionally made to ensure that the insulation is in good condition throughout.

5. Magneto or contact breaker points should be kept clean with flat surfaces and the setting kept to the correct figure, usually .012/.015in. The timing should be set by the maker's servicing staff, and this should not be departed from without the guidance of properly skilled and experienced persons.

6. The air intake cleaner or filter should be periodically cleaned so that there is no restriction on the quantity of air reaching the engine.

7. Valve tappets should be checked periodically to ensure that they are at the maker's correct setting.

8. The general condition of the engine, particularly valves and piston rings, should be watched and steps taken to have valves reground or new rings fitted in good time. Running an engine with badly-seated valves or worn rings is not only very wasteful of fuel and lubricating oil, but also increases the ultimate cost of repairs to the engine.

The points requiring attention on the diesel engine are primarily concerned with the injection system and this aspect is dealt with later. Apart from this, combustion is very much improved and consequently economy increased by making sure that the engine receives an adequate supply of air, and that there is no loss of compression. Periodical cleaning of the air filter is therefore every bit as necessary as on a petrol engine, and in heavily-loaded engines it is possibly even more necessary.

The same remarks apply with regard to valves, valve seats, and piston rings as in the case of the spark ignition engine.

Many makes of diesel engines have a tendency to build up carbon in the exhaust ports, pipe, and silencer. These deposits, in general, build up far more rapidly than with a spark ignition engine. Attention to keeping the exhaust system free will always be very beneficial to the general operation, and particularly towards minimising internal deposits in the diesel engine.

Injection System

The injection system includes the fuel injection pump and the individual injection valves or sprayers. The servicing and adjustments of fuel pumps and sprayers should be done only by properly equipped and trained servicing staff. Under no circumstances should fuel pumps and injectors be dismantled under makeshift conditions. If properly looked after, this equipment on the diesel engine will operate for thousands of hours with very little more than occasional settings and adjustments by the pump servicing stations. There is, therefore, very little in this connection that the average owner can do, but it cannot be emphasised strongly enough how vitally important it is to take care of this equipment by scrupulous cleanliness of the fuel. The injection system has to deal with minute quantities of fuel exactly measured at each stroke under very high pressures, and the moving parts are manufactured to extraordinarily fine limits. Even the finest dust and sediment in diesel fuel will increase the wear on the injection parts and lead to premature deterioration in running.

In this connection a statement by engineers of a well-known diesel engine manufacturer is quoted:—

"It is our belief, therefore, that by the provision for use of relatively clean fuel in equipment designed to be least affected by ordinary slight contamination, the service problem for the diesel injection equipment is definitely less troublesome than for much of the other mechanical equipment on engines. For instance, we cite re-

N.Z. Holders of 250,000 A.M.P. Policies are very substantially

HELPING TO FINANCE VICTORY

The munitions, the equipment, the materials that are the price of Victory are endless: tanks and planes, guns and torpedoes, battleships and aircraft carriers, huge armies and their equipment, and all the other requirements of total war. To provide enough of these things, vast sums of money are needed. And the New Zealand Government needs that money now—today!

The 250,000 holders of A.M.P. policies in New Zealand are playing a big part in helping to finance Victory.

The A.M.P. Society takes a humble pride in the fact that, over the years, its members (who own it) have so built up its strength that it now has nearly **£15,000,000** invested in New Zealand and Local Government Loans, In addition it has placed at the Government's disposal for **War purposes** nearly **Three Million Pounds in New Zealand.**

The Society has now lent over **£51,000,000** to the Australian and New Zealand Governments and is adding to this total about **£500,000** every month.

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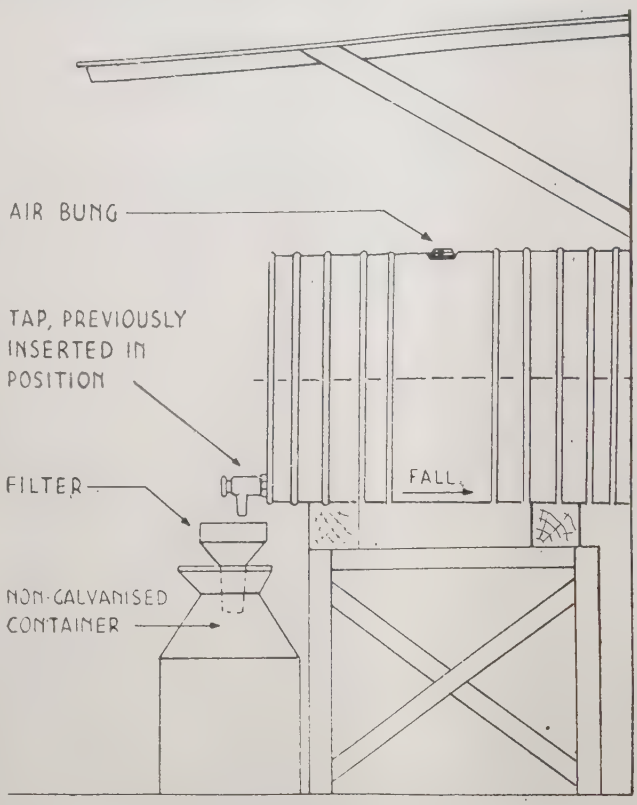
cords of life of over 14,000 hours' operation, where injection equipment is still performing in an entirely satisfactory manner without any adjustments. At an average relative speed of 30 m.p.h., such life corresponds to about 420,000 miles. This is considerably above the life of electrical ignition equipment ordinarily used on kerosene engines."

Cleanliness of Fuel

Cleanliness of the fuel can be ensured, first by careful attention to filters, so that they are periodically cleaned and kept in perfect condition, and second, by taking scrupulous care to exclude the entry of any dirt, dust, sediment, water, etc., into the fuel before or when it is supplied to the engine.

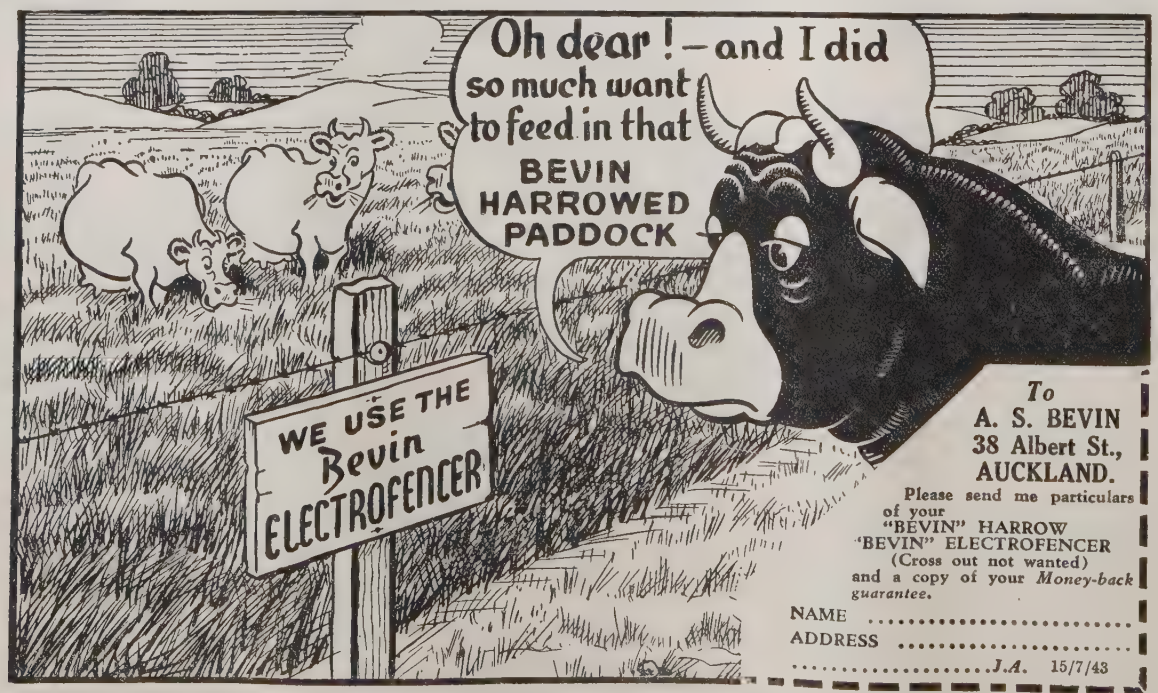
The oil companies supplying Diesel fuel go to a great deal of trouble and expense to endeavour to supply these fuels in the cleanest possible condition, but the most careful packing cannot safeguard fuel when the container is liable to be left open in dusty or wet surroundings. Dirt is also likely to become present by rough handling of drums loosening metal flakes, or particles trapped in crevices.

In the case of fuel being used in 44-gallon drums, the most satisfactory method is to mount the drum on its side with the outlet end raised approximately 1in higher than the other, when a drain tap is used in the bung hole. The contents of the drum should then be allowed to settle for at least several hours, and preferably two or three days in this position before any fuel is drawn off. Any fine dust, sediment, or water which may unavoidably be present will then settle to the lowest part of the drum below the level of the drain tap. Similarly, whatever means are used to transfer from the actual drain tap to the engine tank, the pipe, cans, etc., should be scrupulously clean, and should aways be covered after use so that dirt or even atmospheric dust cannot settle on the oily surface. Galvanised metal should not be used on any part of the installation in contact with oil fuel.



Drum mounted on side as described.

It should be remembered that dirt particles finer than are visible to the naked eye are large enough to wear and score injection system parts. The most efficient way of removing such particles is by settling and a precaution as simple as this can pay handsomely in repair bills.



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ADDRESS .....
.....*J.A.* 15/7/43

OBITUARY

Mr. M. J. Scott, B.A. (Cantab.), B.Sc. (N.Z.), A.I.C.

IT is with regret that we have to record the presumed death of Mr. M. J. Scott who was a passenger on a plane which disappeared during a flight between the Pacific Islands and New Zealand.

Mr. Scott was born in South Canterbury, where he received his early education. In 1914 he entered Canterbury University College and had completed the first professional section of the B.E. degree before enlisting in the New Zealand forces in 1915. He held a commission and saw service until severely wounded in France in 1917.

[S. P. Andrew & Sons, Photo.

After the war he entered Cambridge University as a war bursar and took his B.A. degree in Agriculture before returning to New Zealand to occupy the position of Agricultural Chemist at Canterbury Agricultural College, where he was active in teaching and in research for which work his broad practical background and his sound academic training fitted him admirably.

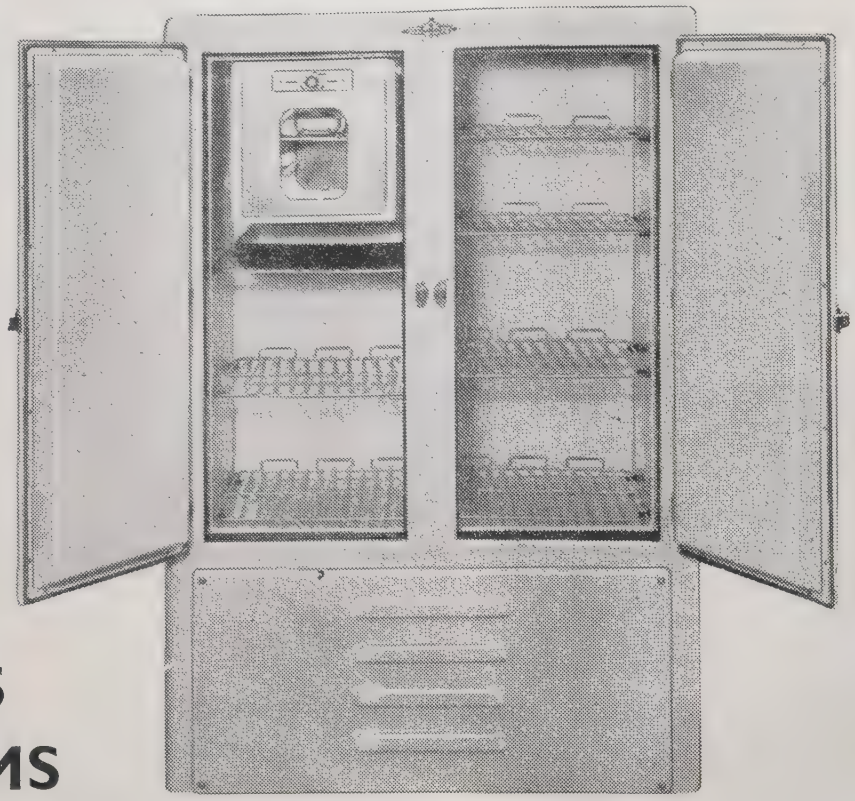
His research interests developed in two stages. From 1922-34 he carried out extensive studies of the influence of different manurial treatments on farm crops and pastures. He made many contributions to the knowledge of the influence of concentrated fertilisers on pastures, and to many phases of pasture management. As a keen mathematician Mr. Scott was one of the pioneers in New Zealand of present field experiment technique and of the statistical interpretations of results.

He was also keenly interested in the production and utilisation of animal foods and carried out many practical feeding trials and metabolism experiments. Outstanding in this field was his work on the utilisation of meat bye-products of the meat packing industry, the results of which are reported in one of the early bulletins issued by the Department of Scientific and Industrial Research. In this work he concentrated largely on pigs and his research contributions to the pig industry were so widely appreciated that in 1936 he was appointed to the Department of Agriculture as Superintendent of the Pig Industry, the position which he held until the time of his death. In recent months he held, in addition, the post of Supervising Organiser of Primary Production Councils. He published many articles on his work in the Journal of Agriculture and in the papers of Canterbury Agricultural College. He was for several years a member of the council of the Grasslands Conference.

As a man of wide interests and with a deep sense of duty, an able lecturer and a sound administrator, Mr. Scott's disappearance while engaged on essential work will be a shock to his many friends and a severe loss to New Zealand. His loss will be felt by the primary producers of the Dominion, and the sympathy of the Department and Primary Production Councils is extended to his widow and family.

Baconer Prices

The price for baconers from November 1 will be 6¾d. a lb.—not 6½d. a lb., heads off, as stated on Page 349 of the July issue of the Journal.



TODAY'S PROBLEMS

are FRIGIDAIRE'S OPPORTUNITY

The majority of businesses find it a fairly easy matter to live up to their avowed principles in ordinary times. It is under circumstances such as exist today that the true test comes.

Frigidaire is doing perhaps more than its share of war work. Frigidaire has its own staff and material difficulties too. But these things to Frigidaire are just opportunities to prove our ability and willingness to live up to the Frigidaire policy of accepting unreservedly its responsibility to its users.

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Farm Gates

WITH bolts in short supply, and with nails proving unsatisfactory, an alternative medium for constructing farm gates is available on most farms. Short pieces of No. 8 galvanised fencing wire can be utilised, and its use has proved quite efficient and permanent, though slightly slower in applying than either nails or bolts.

When joining the timber, two ¼ in. holes are bored through the pieces to be fastened together, usually on the diagonal, and each end of the wire threaded through the respective holes. With a wire twister, one end is

twisted around the other and cut off short so that no protruding points are left. The other end, usually left about 3 in. long, is then kinked into a right angle half an inch from its end, and this point is later driven into the timber.

The accompanying illustration shows, on the upper joint, the wire twisted and kinked ready for driving into the timber, and on the lower joint, the completed fastening.

Gates so constructed have already given years of service at little cost, while the diagonal nature of the fastening acts also as a stay, and reduces the strain on this member of the gate.

—G. A. BLAKE, Instructor in Agriculture, Hastings.

Correction

READERS are asked to note two corrections in the article "Improving Nelson Pastures" in the June issue of the Journal. Line 3 in the third column of page 359 appears as "warning, heavy inclusion of ryegrass"; this should read "*warning, heavy inclusion of cowgrass.*" In the section "Surface renovation" in the first column on page 361, the 4th line reading "terranean clover, surface sown, in im-" should read "*terranean clover, white clover, rye-*"

KEEP THEM ON THE MOVE

RAILWAY WAGONS MUST NOT STAND IDLE

Efficiently and dependably the railways are moving the greatest volume of freight traffic in their history—a tremendous job and one which calls for the hundred per cent. co-operation of shippers and receivers. Wagons have to be loaded heavier, sent away faster, and emptied quicker than ever before. Every wagon must be kept moving; there's no room for sleeping shipments. It's transportation we have to deliver. . . . Someone else must supply the storage accommodation

SPEED WAGONS —— SPEED VICTORY

Slaughterings of Stock

THE following returns of slaughterings of stock at meat-export slaughterhouses and abattoirs for the month of May, 1943, have been compiled by the livestock division:—

District.	Cattle	Calves	Sheep	Of which Ewes were	Lambs	Pigs
North Island.						
Meat-export Slaughterhouses—						
Auckland	45,233	8,884	31,397	9,316	48,790	13,513
Poverty Bay-Hawkes Bay	14,327	5,092	55,728	23,112	88,973	2,209
Taranaki-Manawatu	22,715	806	36,973	17,702	112,356	13,729
Wairarapa-Wellington	10,921	2,703	30,984	16,504	85,919	2,112
Totals	93,196	17,485	155,082	66,634	336,038	31,563
Abattoirs	12,061	4,410	50,575	22,169	10,046	7,185
North Island Totals	105,257	21,895	205,657	88,803	346,084	38,748
South Island.						
Meat-export Slaughterhouses—						
Nelson-Marlborough	706	1	5,305	3,164	26,765	1,323
Canterbury-Westland	1,901	1,542	75,357	65,894	250,894	3,375
Otago-Southland	3,414	6	47,186	38,465	385,715	717
Totals	6,021	1,549	127,848	107,523	663,374	5,415
Abattoirs	5,235	1,244	22,965	13,590	4,166	2,602
South Island Totals	11,256	2,793	150,813	121,113	667,540	8,017
Dominion.						
Meat-expt. Slaughterhouses	99,217	19,034	282,930	174,157	999,412	36,978
Abattoirs	17,296	5,654	73,540	35,759	14,212	9,787
Grand Totals	116,513	24,688	356,470	209,916	1,013,624	46,765
May, 1942,— Meat-export Slaughterhouses and Abattoirs	108,483	11,183	244,370	158,557	849,981	94,043
May, 1941,— Meat-export Slaughterhouses and Abattoirs	101,049	11,534	344,072	225,176	979,679	108,666

Slaughterings of Pigs

The 46,765 pigs slaughtered at meat-works and abattoirs during the month of May, 1943, were distributed in weight ranges as follows:—

Up to 60lb.	1,604
61 to 120lb.	27,669
121 to 160 lb.	13,035
161 to 180lb.	1,568
Over 180lb.	1,337
Sundries	1,552
	46,765

The grading of porkers was 91 per cent. of 1st quality, 9 per cent. of 2nd quality, and that of baconers was 83 per cent. of prime 1's, 13 per cent of prime 2's, and 4 per cent. 2nd quality.

In the different weight ranges of baconers the grading was as follows:—

121-160	84%, 13%, 3% of P1's, P2's and 2nds respectively.
161-180	84%, 12%, 4% of P1's, P2's and 2nds respectively.

'PHENOVINE'

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Cooper's Phenothiazine
WORM DRENCH POWDER

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Removes more worms in ONE DOSE than any other remedy.

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Veterinary Notes for the Farmer

Feeding Oats to Lambs and Sheep

AS there is a probability of a shortage of green feed during the winter, sheep owners should consider the advisability of supplementing the feed with a ration of oats, or oats and chaff. Mr. H. E. Jepson, of "Alaska," Methven, has forwarded the following suggestions:—

At first there may be some difficulty in getting the sheep or lambs to take the oats, but this can easily be overcome by keeping them in a small paddock containing several feeders holding the oats, which have been sprinkled with molasses, and in a day or so one will find the oats are readily eaten.

A good number of feed troughs should be provided, and one 12-foot-long trough for each 20 or 25 lambs is recommended, as the lambs settle down to feed better when they have plenty of room.

The oats must be sound and clean; seconds may be used provided they come into this classification. To commence with, one bag of oats approximately 140lb., is sufficient for about 500 lambs per day, this quantity being gradually increased until about one pound is fed per lamb each day. Lambs or sheep on rape or turnips are greatly benefited by a supplementary ration of oats, but when on rape it is advisable to take them off during the night in order to prevent an attack of bloat.

Mr. Jessop is a very strong advocate of oat feeding to all classes of sheep that are on any kind of green feed, turnips or rape, and considers that after a farmer has tried this supplementary oat feeding he will always continue the system.

Other Experiments

In addition to the above, the following extracts have been taken from experiments made by other farmers:—

A South Canterbury farmer found that he could fatten cull ewes on grass by giving them a supplementary ration of crushed oats, 1lb. per head per day, and he mentions the fact that he noticed a stray lamb in poor condition which was seen to come regularly to the feeders for its ration of oats, and when drafted six weeks later it went away a first quality lamb weighing out at 33lb.

In bad weather it is advisable to add chaff to the oats, using equal quantities of each. The chaff should be added by putting it on the bottom of the trough and the oats on top, no mixing. During the feeding of oats to the sheep the weather was anything but good fattening weather, so it would appear that under favourable conditions a great deal less grain would be required.

Another South Canterbury farmer is feeding oats to his sheep but not so heavily. He uses a mixture of oats and oaten sheaf chaff, one of oats to two of chaff. He commenced feeding the dry feed in December while the lambs were running with the ewes, and reports that he had no trouble getting his lambs away fat. On each of the above farms the death-rate was noticed to be quite small, and this was during the time when parasitic trouble was very prevalent.

Giving supplementary feed to lambs when they are with the ewes is a strong safeguard against the commencement of parasitic invasion which is the principal cause of later troubles at the hogget age, and also prevents any possible check at weaning time.

Sheep should be taught to eat supplementary feed at an early age so as to prevent them receiving a bad setback when feed has to be put before them during very inclement weather, and their natural feed is unobtainable.

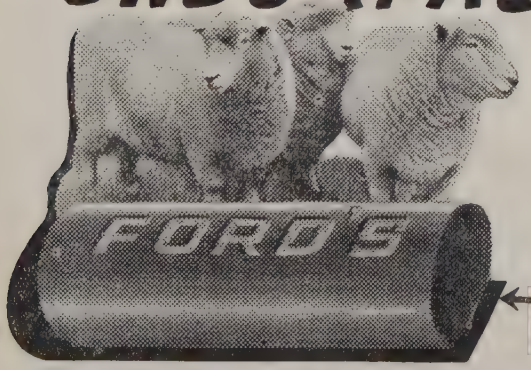
De-horning Calves

WITH the approach of the calving season, the question of de-horning calves should be considered, as the best time to do this operation is a few days after birth when the horn bud is soft, and can be treated painlessly and effectively. This can be done with a caustic stick, obtainable from a chemist at a cost of a few pence. Care must be taken in handling the caustic stick as it may make the hands and fingers sore. It should be wrapped in a piece of paper except the end which is to be used.

Th preparation of the calf first consists in clipping the hair from the horn buds, being careful not to break the skin. Moisten very slightly the uncovered end of the caustic stick and rub it on the horn buttons, first on one and then on the other, two or three times, allowing the caustic to dry after each application. Be careful to apply the caustic to the *horn button only* for if brought into contact with the surrounding skin it will cause pain. Too much moisture on the caustic stick will cause it to run and destroy the surrounding skin, and perhaps the face. After treatment the calf should be kept protected from rain until the scab has become quite dry.

—J. M. FERRIDAY, Inspector of Stock, New Plymouth.

UNSURPASSED!



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Answers to Correspondents

Blood in Milk

"A. J." (HASTINGS):—

I have a heifer which I reared myself and which has now been in milk about 8½ months. There was a little blood quite early after calving, but of that I took little notice as it often occurs in young cows. This cow is now in calf, due about mid-August. She has developed a definite blood show in milk in one quarter. This quarter had a small lump in it for about a month or more, but this last few days has shown blood. One other quarter is affected by a much larger lump inside the teat, but shows no blood in the milk. This cow produced about 5½ gallons of milk during November and December, but has now eased off to just under 2 gallons per day.

LIVESTOCK DIVISION:—

This trouble is mainly found in young cows in the early stages of the milking season, but can occur at any time in older cows through injuries such as horn thrusts. Tubercular lesions in the udder have also been known to cause blood in the milk. The trouble does not usually last more than a few days and recovers spontaneously, no treatment beyond careful milking being necessary. In cases where the udder is lumpy or the blood persists it is advisable to have the cow examined for tuberculosis and mammitis.

Lung-worm in Hoggets

"H. W. McK.," (FEILDING):—

Information on the following points relating to lung-worm in hoggets would be appreciated. What type of season favours it, where it breeds, and how picked up—whether direct into the bronchial tubes or whether formed in the stomach—any relation to the different types of stomach worm.

Experiments here seem to indicate it breeds in stagnant water, and is absorbed when the sheep drinks. Injections in the throat have proved helpful.

LIVESTOCK DIVISION:—

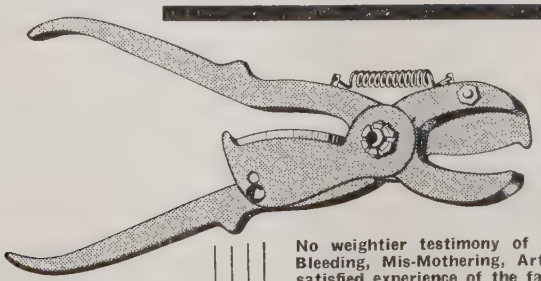
Lung-worm in hoggets is undoubtedly favoured by damp seasons. Moisture is necessary to the life of the larval forms on the soil and on lower parts of grass blades, etc. If conditions are favourable they may live here for twelve months. Wet seasons give more growth and therefore greater cover. Dry seasons kill out a big percentage of the larvae. The eggs are laid by the adult females in the windpipe or smaller airtubes and contain embryos when they are passed out, which may be directly by coughing or in the droppings after swallowing. No multiplication takes place outside.

A certain stage in the open is necessary before the larva becomes infective. When the infective larva is taken in by the lamb it bores through the walls of small intestine and reaches the lungs by the blood stream.

Its life history and the conditions favouring it are similar to those of other parasitic worms. The larvae may survive (but not "breed") in stagnant water, and infection may occur through drinking this. It is not often that lung-worm proves fatal. Much of the loss of condition and most of the deaths seen in association with it are due to stomach worms or intestinal worms present at the same time. There has recently been much controversy about the value of drug treatment for lung-worm in calves and lambs. Direct injections into the windpipe, of mixtures of turpentine, creosote, chloroform, and oil, and also the injection of small amounts of chloroform, have been used. In view of uncertain results and labour involved these methods are not advised.

It has long been recognised that nutrition is almost if not quite as important as drug treatment in intestinal parasitism, and it is much more important in dealing with lung-worm. Therefore, see that feeding is good, and if supplementary feeding with hay, chaff, etc., can be given, so much the better. Dose regularly with a reliable worm remedy such as bluestone nicotine, which will reduce any stomach or intestinal worms present, and may also remove any infective lung-worm larvae at the time in the alimentary tract.

Avoid if possible damp, low-lying areas with shallow pools or surface water for this class of sheep, and keep them on sunny paddocks; older sheep are much more resistant to the trouble. Where areas are known to be heavily infected keep young sheep off them,



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No weightier testimony of the unfailing efficiency of the MOWAT in preventing loss of lambs by Bleeding, Mis-Mothering, Arthritis, and all After-Tailing Dangers could be given than the more-than-satisfied experience of the farmers themselves. Here are a few typical extracts from the many letters of high appreciation.

Hastings Club, Hawkes Bay, February, 1943.

Dear Sirs,—Being among the first users of the "MOWAT" Tailer in Hawkes Bay, we wish to put on record that this tool meets a long-felt want on the farm in connecion with docking, is almost fool-proof and is a hundred per cent. efficient. You can dock a paddock of lambs and in a relatively short time they are mothered up and away. (Signed) JOHN GRAHAM.
(For Netherby Ltd.)

Ocean Bay, Blenheim, 22nd March, 1941.

Dear Sirs,—Previously I nearly always lost one or two, up to half-a-dozen lambs (generally some of the best ones) out of 250, but last year did not lose any with the "MOWAT."
(Signed) W. J. CRUMP.

Dromore, Canterbury, 16th April, 1943.

Dear Sirs,—I tailed over 500 lambs with the "MOWAT" Instrument; did not lose a lamb; Arthritis was conspicuous by its absence, and I am pleased to number myself among the very satisfied owners and users of these instruments. (Signed) D. J. SCARTH.

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and if possible graze with cattle for some months. The cattle will pick up many of the larvae which are not able to develop in this host, and the pastures may be rendered safer for young sheep.

Horses With "Mud Fever"

"Q.W." (GISBORNE):—

Can you state what is the trouble, and advise a cure for several horses with a skin disease on the lower part of the hind legs. They are all clean-legged horses, and I understand "Greasy heel" only attacks horses with a lot of feather; in these cases the hair sticks out, a hard, loose scab forms, and sometimes, but not invariably, there is a moist discharge underneath. The places are very tender to handle, but are not apparently irritable, as I have not seen any of the horses rubbing and kicking the way draught horses with greasy heel do.

LIVESTOCK DIVISION:—

Treatment consists in clipping the hair of the affected part as close as possible and then thoroughly cleansing with a solution of warm soapy water to which a little washing soda has been added. This is necessary in order to remove the hard scales and grease and to allow the lotion to act. Dry the part thoroughly and apply some dressing such as lead lotion or zinc ointment—an ointment or a little olive oil being preferable if the animals are being worked, in order to keep the cracks soft. More severe cases may require the application of a solution of copper sulphate to dry them up.

Attention should also be paid to the diet, which should not be too rich in grains when the animals are not in hard work. A purgative drench, or preferably an aloes ball, should be given when commencing treatment. The term "mud-fever" indicates that mud is a factor in causing the disease, and you are advised to keep the horses out of stagnant water, especially where it has been fouled with urine.

Advisory Service on Veterinary Matters.

Farmers are invited to submit inquiries connected with the health of their stock, and the replies will be published under this heading.

Hoggets with Foot-rot

"R.H.S." (Invercargill):—

I have had trouble with my hoggets' feet lately, and although they are much better now I would like to know how to guard against similar trouble in future. The hoggets were grazing on a low-lying paddock with an abundant growth of fresh grass when they started to get lame. The rubber-like covering on the sole of the foot, and especially on the heel, has come loose from the foot, and in some cases the horny wall is loose too. The ball of the foot underneath this loose covering is inflamed and sometimes raw, but I did not find any pus, and the smell of foot-rot is absent. I moved the hoggets to a drier, hilly paddock, and cut off all loose parts from their feet, and then put them through a foot-bath of 1¾lb bluestone to 1 gallon of water, holding them in for 3 minutes.

Livestock Division:—

To begin with, from the history, your diagnosis and treatment of the trouble affecting your hoggets appear to have been correct. You state that the hoggets were grazing on a low-lying paddock with an abundant growth of fresh grass. One of the commonest predisposing causes to foot-rot is irritation and slight injury to the soft tissue in the space between the claws, and this is very likely to occur among sheep grazing over damp lush pasture. The causal organisms of foot-rot are then able to gain entry through these small abrasions and set up the typical condition of foot-rot.

Recent research would indicate that the causal organism of foot-rot does

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BUT I KNOW THE
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It gives Bloodless Castration by scientific and humane methods.
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per 100 LAMBS

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not survive for more than three weeks on pastures or in mud, but that it will survive for periods up to 3½ years in the feet of chronically affected sheep. Assuming that the organisms responsible for the disease will lose their infective powers if not in contact with sheep for a few weeks, pastures which are kept without sheep for a month can reasonably be taken as free from the infection.

In order that you may guard against this trouble next year it would be advisable as opportunity offers to go through all sheep and treat and isolate any chronically affected animals. The bluestone solution 1¾lb. bluestone to one gallon of water is suitable for treatment of affected sheep. If trouble is anticipated it is also advisable to put the apparently clean sheep through a foot bath containing a bluestone solution half the strength of that used for affected animals. Then put them on to pasture which has been free from sheep for at least one month. Affected animals should not be put back with the flock until they have cleaned up for at least one month. In badly affected cases, after the feet have been thoroughly trimmed and all loose, under-run and diseased horn removed, the feet should be hand dressed with a suitable ointment. A useful dressing may be made up as follows:— Over a slow fire mix one part of powdered bluestone, one part of lard, and two parts of Stockholm tar.

Water in the Calf Paddock

AN adequate water supply on the farm is an essential factor towards good farming, as all animals require clean good water. The calf paddock especially should have a trough of clean water where calves can drink as required. The absence of this essential on many farms is frequently noticed.

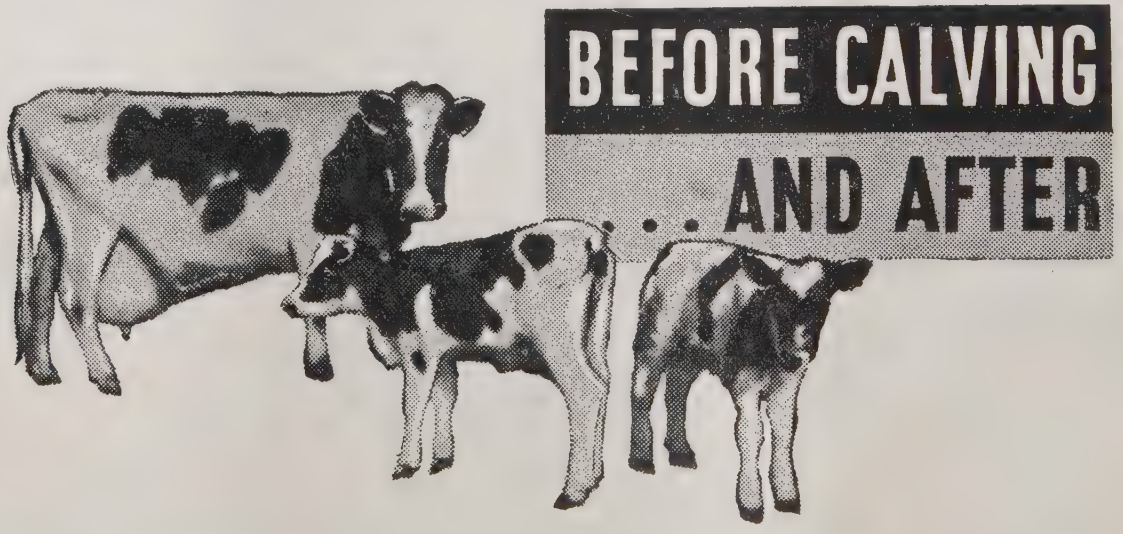
Calves are usually fed twice a day night and morning, and unless a trough of water is available, they have nothing to drink between times. Being thirsty this tends to make them gulp down the milk at feed times, which often sets up a digestive disturbance and a fairly high mortality occurs each year from this cause. A supply of clean water in the calf paddock is therefore strongly recommended.

Calf Rearing

ATTENTION is drawn to a point that is worth consideration in the rearing of calves. On nearly every farm, the calves are kept for a month or two in what is generally referred to as the calf paddock, which is usually adjacent to the milking shed for convenience of feeding. This is quite alright provided care has been given the paddock during the rest of the year after the calves have been reared. This paddock should be limed heavily, well drained, sheltered and fed off with sheep for preference, as calves foul a paddock very quickly and parasites thrive accordingly, setting up parasitic troubles in the calves.

—J. M. FERRIDAY, Inspector of Stock, New Plymouth.

A FREE bulletin (No. 22), dealing fully with coccidiosis of poultry, is available from the Department of Agriculture at Auckland, Wellington, Christchurch and Dunedin.



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Rotational Grazing of Ewe Flock During Lambing

Some Central Otago Practices

THE handling of the ewe flock at lambing is necessarily a subject on which no hard and fast rules can be laid down, as this phase of farming is carried out under practically every condition of temperature and soil type found in New Zealand. Consequently any rules are as liable to variation as the conditions vary from North Cape to the Bluff. Also the period of lambing is generally calculated to coincide with a normal early spring growth, but no one can definitely forecast just when that will commence. A late, cold or wet spring will again cause variations in any set programme of management.

Three methods of handling the ewe flock during lambing in Central Otago are briefly described. The third method, "Rotational Grazing of the Flock," is being practised by a number of farmers who find it proving very satisfactory and successful on irrigated land and on well subdivided farms.

Although this method has been in vogue in different parts of New Zealand for some time, it may be of interest to farmers with suitable sized paddocks and flocks, and who can depend on the normal spring growth coming away reasonably on time, or whose lambing does not commence till a fair growth of feed is assured.

Management Methods

1. Dividing the flock up into separate blocks or paddocks and leaving them there for the duration of the lambing. At the completion of lambing, tailing and marking of the lambs of each paddock is carried out, when early and late lambs are marked together. Any dry ewes are carried on with the flock. This is the usual "station" practice upon which it is difficult to improve when dealing with large flocks or large paddocks.

2. On smaller holdings this is improved with variations of the following. The breeding flock is in one or usually more paddocks, and each day or so the ewes and new lambs are removed from the flock into a clean paddock of good feed. Late and early lambs may be kept separate.

3. Rotational grazing of ewe flock during lambing.

Rotational Grazing

With a flock of 500 ewes and 10 paddocks this method of management can be best carried out, although any sized flock would be suitable if a convenient number of suitable sized paddocks are available.

All the ewes start off lambing in one paddock, and each day, or every second day, they are moved on to the next paddock until all the paddocks have been used. Actually the paddocks are grazed in rotation, and in about 10 to 15 days the flock is ready to commence the second round of the paddocks. At the time the flock is to be shifted the gates are opened and the ewes drifted through into the next paddock, leaving behind the ewes with their new lambs, which, as a rule, do not attempt to follow the flock. The latter are left in the paddock in which they lambed.

After two or three days of lambing the lambs and ewes are gathered up into No. 1 paddock for the duration of lambing. The next lot of 2 to 3-day old lambs are gathered up into No. 2 padock, or, if No. 1 paddock has not its full quota of ewes and lambs more may be added to it, depending on its size, the quickness of lambing and amount of feed available. The next group of lambs is placed in No. 3 paddock and so on.

In 10 to 15 days' time, when the flock is ready to commence the second round of grazing, nearly half the paddocks may be holding lambs and ewes, depending on the quickness of lambing. This will reduce the number of paddocks available for the rotational grazing of the flock, and the flock will by

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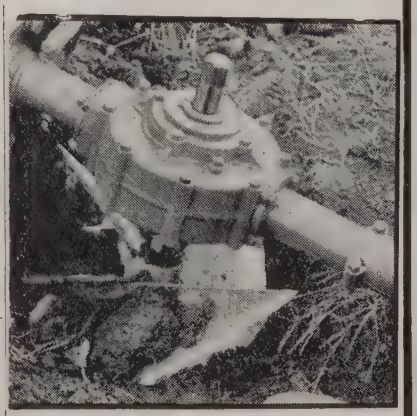

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this time be reduced to about half its original numbers.

Towards the end of lambing it may be necessary to hold the flock in one paddock until sufficient ewes have lambed to occupy that paddock. The remainder, which are likely to be dry ewes and a few late lambing ewes, are then moved into the last paddock where they will remain. At the end of lambing there will be flocks of ewes and lambs in different stages of growth. Each paddock, except the last two, will have lambs within 2, 3 or 4 days of the same age, while in the last paddock are the dry ewes.

Conclusions

The advantages claimed for this system are:—

1. All the ewes due to lamb are in one paddock and can be quickly and regularly looked over.

2. Shifting the flock each day gives the ewes some exercise, so necessary in late pregnancy.

3. Each paddock of lambs, being within a few days of the same age, is marked separately at whatever age the farmer considers most suitable.

4. The first paddock or two of lambs, being the earliest, can usually be got ready for the Christmas market.

5. There is less chance of mismothering in marking each paddock of lambs separately, and the same applies when the ewes and lambs are left for a day or two to settle down in the paddock where they lambed,

6. All dry ewes are automatically drafted into the last paddock, and if not fat can soon be made so, and disposed of early.

—G. G. CALDER, Instructor in Agriculture, Alexandra.

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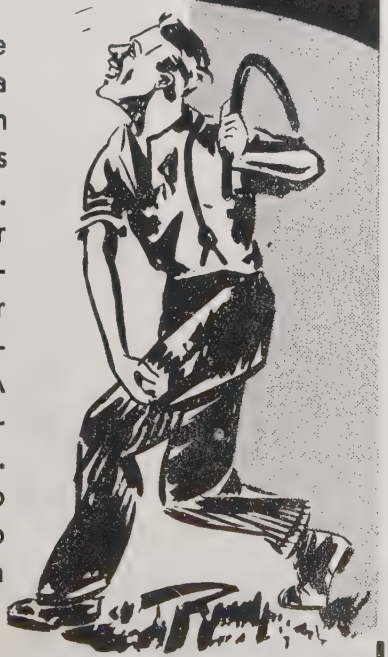

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Radio Broadcasts

RADIO talks to farmers will be given from Station 1YA, Auckland, at 7.15 p.m., on the following dates:—

August 2.—"Improvement of Fruit Varieties," by Mr. C. E. Woodhead, B.Sc., Pomologist, Plant Diseases Station, Auckland.

August 9.—"Cropping for Pigs in North Auckland," by Mr. E. H. Arnold, Instructor in Agriculture, Department of Agriculture, Dargaville.

August 16.—"Brooding and Rearing of Chickens," by Mr. C. R. Jeffries, Poultry Instructor, Department of Agriculture, Auckland.

August 23.—"Young Farmers' Clubs Session," by Mr. S. Freeman, Organising Secretary, Young Farmers' Clubs.

August 30.—"Recognition of Plant Diseases," by Mr. R. R. M. Brien, Mycologist, Plant Diseases Station, Auckland.

Pig Industry Broadcasts

UNDER the auspices of the District Pig Councils concerned, broadcasts will be delivered in August as follows:

1YA, Auckland.—August 19, 6.50 p.m., "Whey-feeding" by Colin Wallace, Supervisor, Waikato District Pig Council.

4YA, Dunedin.—August 9, 7.15 p.m., "Care of Pigs from Weaning to Four Months" by H. Roderique, Supervisor, Otago and Southland District Pig Council.

2YH, Napier.—August 12, 7.35 p.m., "Crops to Grow," by I. H. Owtram, Supervisor, Tairawhiti District Pig Council.

2ZA, Palmerston North.—August 17, 8.30 p.m., "Supplementary Feeds (Grain)," by H. Marsdon, Supervisor, Wellington District Pig Council.

Convenient Farm Gateways

AN appreciable portion of every farmer's time is employed in moving stock about the farm, and for this reason, the general layout of the fields and the planning of the sites for the farm gates well deserve the most careful consideration.

On many farms, the fields and gateways never were planned. Like Topsy, they simply grew; and on such farms the moving of stock from one field to another is apt to become a vexatious and noisy operation, with the unfortunate dog acting the part of scapegoat.

Fig. 1.—Typical four-gateway arrangement on Mr. Taylor's property.

Grouping Gates

Throughout his farming life, Mr. R. J. Taylor, of Warkworth, considers that he has suffered much from this cause, and in his opinion considerable unnecessary travelling and needless bother can be avoided by the careful selection of the most convenient sites for the farm gateways. Instead of simply placing each gate in any more or less handy position in a fence line, Mr. Taylor has now adopted the practice of grouping the gates at the adjoining corners of four fields, and wherever it can be used to advantage this system is being employed at specially selected strategic sites throughout the farm.

The advantages of this method are at once obvious, and will be particularly appreciated on sheep farms, and on dairy farms not designed on the "race" principle.

Direct Access

Since each gate is centre-hung and can open to either side, stock can be conveniently moved from one field direct into any of the other three fields. This avoids the risk of stock getting mixed, and also obviates any roundabout route to avoid damage if any of the fields should happen to be in crop. Moreover, since each of the gates is placed in a corner of a field, little trouble is experienced through stock breaking back when approaching the gateway.

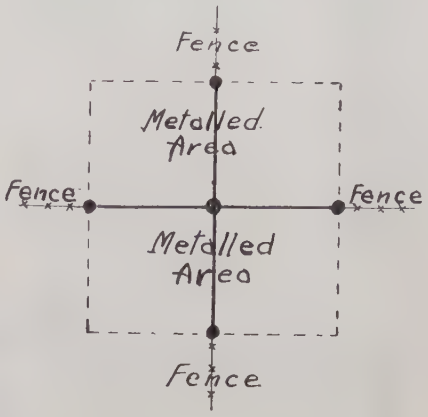
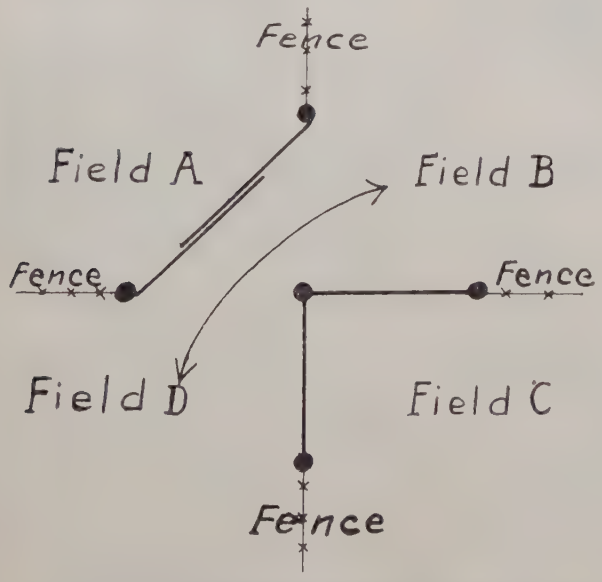
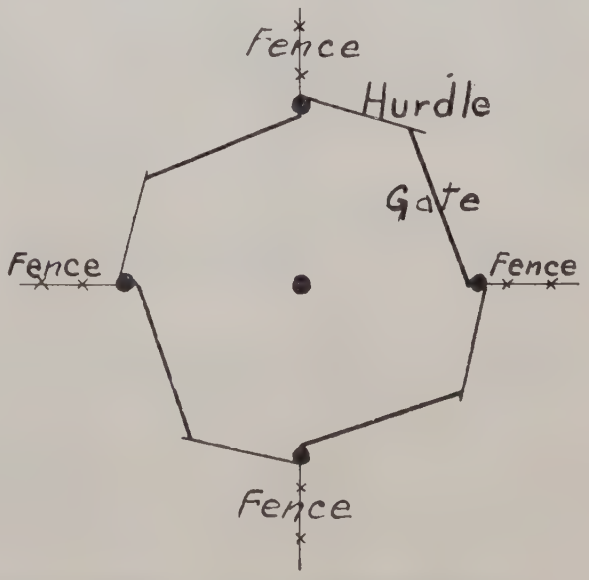


Fig 2.—Showing all four gates shut. Each gate is centre-hung to open either way, and is secured by an ordinary sliding latch. Note (in square) how the metal used to surface two gateways serves all four.





Left. Fig. 3.—Showing gates opened to allow direct access between fields B. and D. Note how two gates swing back to prevent entrance to field A. *Right. Fig. 4.*—Used as a small holding pen. With 10ft. gates, four small hurdles provide a pen having nearly 300 sq. ft. and with direct access to each of the four fields served by the gates. The pen is immediately available on opening the gates and fitting the hurdles in position.

Useful Holding Pen

Every farmer at some time appreciates the value of a convenient holding pen, and Mr. Taylor's arrangement—with the addition of four small hurdles—automatically provides a good-sized pen having direct access to each of four fields. The advantage of having a number of such pens located in handy positions over the farm is particularly appreciated when working with sheep.

Economical

From the viewpoint of economy, two other worth-while advantages of the cross-gates system may be mentioned. It will be noted that the one latch post serves all four gates, thus saving three posts and stays. Furthermore, all four gateways can be metalled at the cost of two—a particularly useful saving where the ground is soft and where gravel is difficult to obtain.

—P. S. SYME, Instructor in Ariculture, Warkworth.

Modern Piggeries.

Better housing, sanitation, and facilities for looking after pigs are among the first improvements that are made with profit on most farms where pigs are kept. Plans and specifications of houses and layouts actually in use in New Zealand are available in the Department's **free** bulletin, "Layout and Construction of Modern Piggeries." Copies may be obtained from the Department of Agriculture, Auckland, Wellington, Christchurch or Dunedin.

Blue Lupin Seed

BLUE lupin seed is usually very reliable. If it is new seed and appears sound, this is generally sufficient assurance that it will prove satisfactory. Some of the lines recently harvested are, however, very deceptive. The appearance of these lines is excellent, but the germination is most disappointing because of the large numbers of hard seeds and broken seedlings. Both troubles arise through the seed having been harvested in an extremely dry condition.

The number of hard seeds in some of the samples tested recently has been as high as 80 per cent. Hard seeds are those in which the seed coat resists the penetration of water. They may lie in the soil for several weeks or even months, before germinating. On account of the irregular and delayed germination the value of the seed is greatly reduced.

The other and more serious trouble is the prevalence of broken seedlings. These result from the too vigorous threshing of very dry seed. The brittle inner parts of the seed become cracked, although the more leathery seed coat may show no signs of damage. Upon germination, the cracked seeds produce only worthless mutilated seedlings, most of which are incapable of emerging from the soil. A very fine looking sample of lupin seed tested recently produced 66 per cent. of these useless broken seedlings.

Anyone purchasing blue lupin seed is well advised to satisfy himself that the seed has been tested and proved to be of good quality.

—E. O. C. HYDE, Seed Analyst, Seed Testing Station, Palmerston North.

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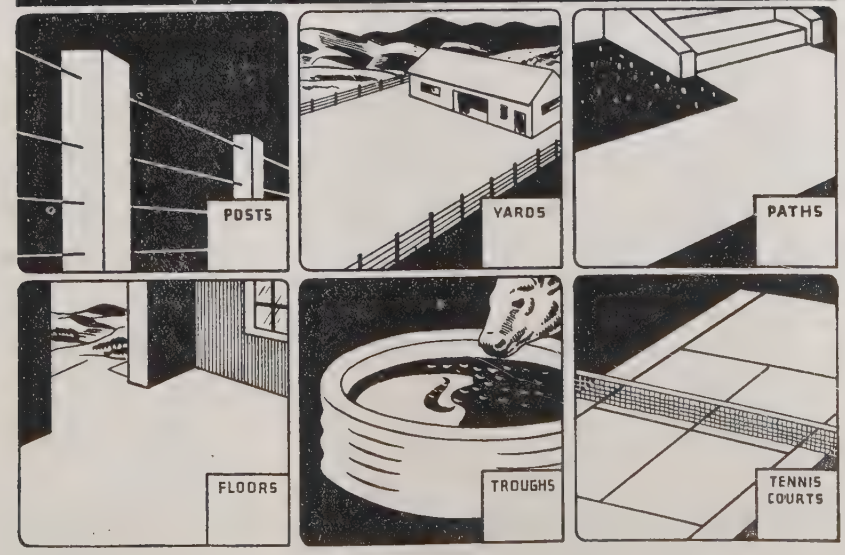

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Orchard Notes

Seasonal Work in the Orchard

IT is always wise to plan well in advance the orchard work which will require attention.

The crop per tree is an important factor in fruit production, and any improvement shown in this direction is a decided step towards success. Generally the cost of production decreases as production increases. Extra attention given in cultural methods will assist production and so result in an increased financial return to the producer.

Important seasonal operations for this period of the year are:—

1. Expedite the pruning of pip fruit trees.
2. Complete the pruning of stone fruits as early as possible.
3. Where necessary for the control of insect pests apply oil sprays to deciduous fruit trees.
4. Spray stone fruits with Bordeaux mixture for the control of fungous diseases.
5. Attend to the planting of new areas and replacements where needed.
6. Make provision for adequate drainage and shelter.

Winter Spraying

Insect Pests.—Where San Jose scale is present on fruit trees spraying is essential. Measures for its control should be undertaken during the dormant season, otherwise the scale will be a menace as it increases rapidly during the spring. The trees should be sprayed thoroughly with red spraying oil at a 5 per cent. dilution. To avoid damage to buds this spray should be applied just before bud movement. Other scale insects are also effectively controlled by the use of the same spray.

Where a good clean-up of red mite has not been obtained during the summer months, and fruit trees are showing a carry-over of egg infection, it is essential that the trees should be sprayed in order to suppress the activity of the mite during the early growing season, which often occurs if dry weather conditions prevail during that period.

Winter oils should be applied at a 5 per cent. dilution during the dormant period to stone fruits and not later than bud movement to pome fruits.

Fungous Diseases

The principal diseases of stone fruits which can be readily controlled by spraying are leaf curl, bladder plum, and shot hole fungus. To obtain success in the treatment of these diseases it must be preventive and not curative. The method of prevention is the application of fungicide sprays. For this purpose Bordeaux mixture 5:4:50 should be applied just before the buds begin to swell. In some cases it is not necessary to make more than one application of this spray, but in districts where cool and moist conditions are usually experienced in the early spring, an additional application of Bordeaux mixture 3:4:50 should be made when the fruit buds are showing colour.

Orchard Sanitation

The value of orchard sanitation cannot be too strongly stressed, and should be practised in every orchard if effective control of insect pests and fungoid disease is to be obtained. A winter clean-up, to be satisfactory, must be thorough and systematic; therefore, the matters requiring immediate attention are:—

(a) Clean up and destroy all rubbish and litter lying around the headlands and in the orchard.

(b) Prune out and destroy immediately all cuttings infected with scale and disease.

(c) Gather and destroy all waste fruits and mummies; on no account should this class of fruit be left lying on the ground.

(d) In and around the packing shed examine all cases that have been used as packing boxes or for the holding of fruit.

(e) Tidy up the packing shed and destroy all waste fruit lying about.

Planting

Attention should be given now to the planting out of new areas or replacements where needed. In preparation for planting, the soil should receive a thorough breaking-up as deeply as possible and be brought to a fine tilth. Trees should not be planted out while the soil is wet and soggy, and unless the soil is in suitable condition planting would be better delayed until early spring.

Shelter

The provision of adequate shelter for the orchard should not be overlooked. In most localities a windbreak is essential if fruit trees are to be grown successfully. In addition to guarding the trees against being broken or blown over, shelter provides protection to the foliage, which, if it becomes damaged, is unable to function efficiently as the food manufacturing organs of the trees.

Drainage

If the soil is somewhat waterlogged attention should be given to correct-

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ing this unfavourable condition, as fruit trees will suffer from the effects of wet feet and will not thrive on soils in this condition. It is important that drainage should be free. In heavy retentive soils the laying down of underground drains permits the deeper rooting of the trees and assists in eliminating the souring of the soil, and also allows the trees to receive the full benefit of their fertiliser treatment. Tiled drains are of the longest duration, and although the initial outlay may be more expensive, they ultimately give the best results.

Grafting

Although it is some time before grafting operations commence, provision should be made during the pruning season for a supply of suitable grafting wood. The scions selected should be of pencil thickness, and from perfectly healthy wood of the current season's growth. It is important that the scions be kept in good condition until required for re-working, and to do this they should be buried in the ground in a cool, moist place, care being taken to see that the soil is kept in a moist condition.

—A. T. DOUGLAS, Acting District Supervisor, Horticulture Division, Auckland.

Citrus Notes

Citrus Notes

(Continued.)

THE **Leaf-roller caterpillar** is a species of *Tortricid* moth. Like the citrus-borer beetle, the adult moth is seldom seen in the citrus orchard, but this caterpillar probably does more damage to citrus trees, especially New Zealand grapefruit and sweet orange, than is often realised.

As its name implies, this moth at the caterpillar stage has a habit of binding leaves together by means of webbing, or binding a leaf on to the surface of a fruit. If the leaves are separated the caterpillar itself will generally be found, but it is fairly active, and is apt to wriggle and suddenly drop to the ground by means of a thread. The caterpillar is about ¾ in. long with a dark brown head, and a greenish-brown or whitish body. On removing an adhering leaf from a lemon fruit the whole area under the leaf may be chewed out, or there may be a distinct hole in which the caterpillar is present. The damage on lemon trees seldom warrants special control measures. Annually, however, the shedding of young fruits from New Zealand grapefruit or sweet orange trees is serious. Although some of this dropping is physiological, much of it is caused by leaf-roller caterpillars chewing the young fruits shortly after the flowers have set. In addition, much of the surface blemish seen on the fruits of New Zealand grapefruit and sweet orange is probably due to the action of leaf-rollers on the young fruits. As the fruit matures these injured parts may form extensive grey or dark brown marks.

This chewing insect can be controlled by the application of the standard spray for such insects, i.e., 1½ lb. acid lead arsenate to 100 gallons of water. As arsenical sprays should be applied sparingly to citrus trees owing to their effect on the acidity of the fruit, make the two necessary spray applications to orange and New Zealand grapefruit trees only in November and again in January.

The *cicada* can only be regarded as a citrus insect pest on young trees. This insect makes a characteristic singing noise throughout the summer, is very common, and fairly readily caught by hand. The insect is large, 1½ ins. long, oval in shape, with prominent black eyes and clear transparent wings. The female causes injury to the green succulent stems of young citrus trees by laying its eggs in the plant tissues. To do this it inserts a sharp saw-like egg-laying apparatus which causes characteristic cuts. These form a disfigurement and temporary point of weakness in the branch.

In conclusion, it is necessary to reiterate that for the control of these insect pests it is essential to identify the insect and know its life history, determine when it is most vulnerable, and apply the necessary control measures.

Spray materials are of value and many are in short supply. Be sure you are using your materials to best advantage by an adequate knowledge of the insects you are endeavouring to exterminate.

—A. M. W. GREIG, Citriculturist, Wellington.

Cool Storage Notes

Cool Storage of Sturmer Pippin Apples

INVESTIGATION over past years in the occurrence of internal breakdown in Sturmer Pippin apples indicates that to some considerable degree the incidence of the disorder has been influenced by the temperatures maintained in different cool stores.

Although there are a number of factors concerned in the production of apples which may exert influence on their keeping quality and susceptibility to internal breakdown, the temperature at which the Sturmer variety is stored increases its liability to this trouble. The lower the temperature of storage the greater the incidence of breakdown.

Numerous investigations with Sturmer Pippin apples embracing a wide range of circumstances and conditions, including storage temperatures, have been carried out during the past 15 years, and accumulated data provide conclusive evidence that liability to breakdown of Sturmer apples is progressively increased by storage at temperatures below 38 degrees Fah. While it is not suggested that breakdown in the Sturmer variety will be entirely eliminated by storage at a temperature of 38 degrees F., experiments have shown that this temperature provides a safeguard margin against the incidence of browning and softening of unexposed tissue due to production and storage variables.

Inspection of Fruit Held in Storage. —Differences in the storage quality of the fruit from various orchards, even where they are situated in the same locality, can be found in the lines held in storage. Where the storage conditions are similar for good and bad lines poor storage results can be attributed to pre-storage conditions of which the most important are: (1) Time of picking; (2) period which elapses between picking and storage; (3) production variables. The keeping qualities of fruit from trees with a light crop are generally unsatisfactory.

All storage stocks should receive a regular careful examination at weekly intervals until released for marketing.

—A. A. POWELL, Cool Storage Officer, Wellington.

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A Planned Garden Increases Production

"Production on farms is as vital as arms."

"WELL after all I appreciate the fact that we farmers don't know quite everything, or perhaps as much as we should know, concerning the production of vegetable crops," said the farmer to the visiting officer of the Department of Agriculture, while working in his garden. "I have had a talk with two of my neighbours, both of whom you visited recently, and from what I gathered we think it might be as good for us, as it undoubtedly would be for your Department, if interested farmers could conveniently arrange meetings for the purpose of discussing problems associated with vegetable production. An officer could be invited to attend and perhaps take part in any discussions which arose." The visiting officer readily agreed that the suggestion was well worthy of some consideration. He remarked that, from the point of view of the ordinary citizen, of conditions obtaining in the Dominion at the present time, it seemed as if an appreciable increase in the supply of vegetables during the 1943-44 producing season would be an urgent necessity.

It was suggested that consideration might well be given by farmers to the production of certain vegetables which would be required in more than usual supplies. This, it was stated, would necessarily depend on the availability of suitable land. Before parting with the farmer-gardener, the officer intimated that, should the matter of holding meetings be favourably discussed, and the presence of an officer from the Department of Agriculture desired, a note addressed to the Director, Horticulture Division, Department of Agriculture, P.O. Box 3004, Wellington, would be appreciated.

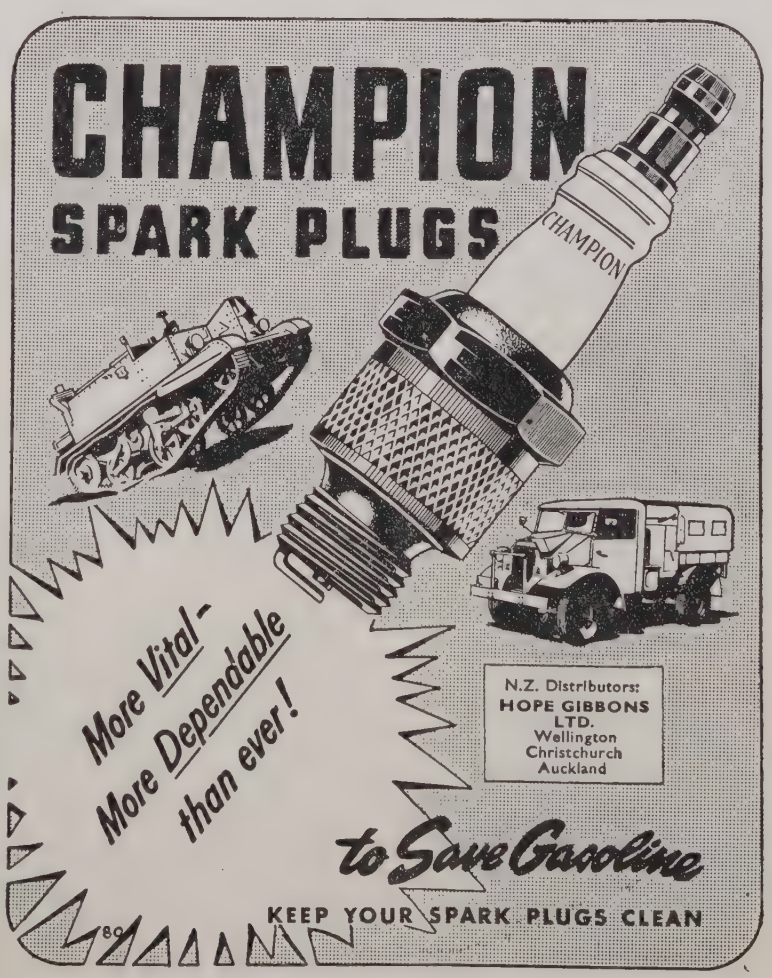
"It's a principal with me, if you have an idea that you carry it out." (Dickens).

Plan Your Garden

It hardly seems necessary to suggest that during early August preparations should be made for gardening operations in relation to vegetables for the coming season, and the first essential is—**a plan.** Without a garden plan the work performed will, more or less, be of an indiscriminate nature. The plan should not be decided upon or adopted merely to suit one's convenience, but should, preferably, be based upon past experience and recognised sound cultural practices.

Reflections should be made on whether the type of garden soil was right for the crops that were grown. If an early variety of potato has been grown, better results might have been obtained if seed for a main or late crop had been planted. For cabbages, was the soil too light for a main crop, and did it dry out too quickly to prevent proper maturity? Was the carrot bed attacked by the carrot rust-fly last season? If so, does the garden plan provide for carrots to be grown this season as far removed as possible from the area occupied last season by this crop? Were late spring cabbages planted in a low-lying part of the garden so that many of the outside and main wrapper leaves became affected with yellow spots of varying sizes, and is it planned to use a more suitable part of the garden during the coming season? Were climbing beans responsible last season for unduly shading another crop, and has a more suitable site been chosen on which to grow beans during the coming season?

These, and many more questions, should be asked and answered. Planning of the garden will lead to greater efficiency and economy in production, and this applies equally to the home gardener as well as to the commercial



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vegetable producer. It should be recognised that whatever success is achieved during the forthcoming growing season, it will in a great measure be due to the manner in which preparatory work has been carried out.

"Dig for Victory"

The necessity of more and still more vegetables is again stressed. When it is realised that in the recently bombed areas of the City of London there are, in parts which have been cleared of debris, several thousands of vegetable-producing plots, it might be appreciated to what extent crops could be grown on many available parts of the Dominion. The **Will to Win** in Great Britain has been translated into the **"Dig for Victory"** campaign.

A similar campaign has been launched throughout New Zealand, and **"Dig for Victory"** applies not only to the city or suburban resident, but to all who have available space which could be utilised for the production of vegetable crops. An appropriate slogan for the coming season would therefore be: "Better planning for better production of bigger and better crops."

Spinach

A supply of this vegetable can be easily maintained by regular and timely sowings made at three weekly intervals. For quick and tender growth, nitrogen as a fertiliser is necessary,

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A fair sample of Sutton's Supreme grown on Stewart Island. The soil was virgin and the "seed" planted—as shown below the rule—was the thickly cut "rose" end of potatoes bought for household use. The roots averaged 7 to 12 tubers each.

and once the young plants are about half grown liquid manure, particularly rich in nitrogen, will assist early maturity. In the absence of nitrate of soda, poultry manure in the liquid form will be a good substitute. This manure should, however, be gathered dry and kept dry, so that its nitrogen content in the form of ammonia will be preserved.

Lettuce

If the early-grown lettuce plants have not yet been set out, this should be attended to without delay. The soil in the bed must not be allowed to become "set." Shallow cultivation is necessary in order that the soil may absorb all the warmth available.

Cabbage

Allow plenty of air to circulate among the seedlings growing in the bed; they should be fully exposed to sun and wind during the day, even if protection is considered necessary at night where weather conditions are somewhat severe.

Shallots

The food and domestic value of this vegetable of the onion species is, perhaps, not as well known or as highly appreciated as it might be. If it were, it would undoubtedly be allotted a more important place and a greater area in the home gardener's operations As to its food value compared with the onion, it is authoritatively stated to contain, weight for weight, three times as much nitrogen, two and a half times the amount of minerals, half as much again the quantity of phosphates, and rather more potash, two and a half times as much sulphur, and what is perhaps of the greatest importance of all, getting on for three times as much iron.

Particular attention paid to the crop during the growing period will be amply rewarded, as prolific producing varieties will return a harvest of from five to twenty-fold. A good rich loam into which, the previous autumn, has been dug a liberal dressing of well-rotted stable or farmyard manure will make good soil conditions for planting the bulbs. Should this manure not be available, dried blood or blood and bone, applied at the rate of 3oz per square yard, after digging and well worked into the top soil, will be suitable. As soon as active growth begins, liquid manure may be applied two or three times. Continued use of this fertiliser will be injurious to the keeping quality of the bulbs.

Planting should take place early in August, and, set in rows 12 inches apart, with 8 inches between the bulbs, sufficient space will thus be allowed

Dont's

Don't

overlook regular inspection of vegetables in store. Disease spreads rapidly among vegetables stored in bulk.

Don't

delay the purchase of seed requirements until they are actually required. You may suffer disappointment.

Don't

walk around the garden looking for something to do. Ask the "other half" about it, you'll get a job alright.

Don't

forget to "Keep the Garden Soil Turning." (A new adaption of an old theme).

for development. When planting, the bulbs should merely be pressed on top of the ground so that they will remain in an upright position; rooting will start almost immediately.

Cultivation should be directed mainly towards weed control, and must never be deep, merely surface hoeing. Although part of the crop may be ready for use during late December, harvesting, under normal conditions, will take place during late January and February. Careful handling of the bulbs is necessary during curing and for future use. They should, preferably, be stored where plenty of fresh air is constantly circulating. With the exercise of proper care during harvesting and storage, shallots will keep well on towards the end of the year in which they are harvested.

Onions

August is generally recognised as the most appropriate time for transplanting onion seedlings to the place in the garden where they will grow to maturity. The soil, it is assumed, has been dug early and well prepared. Failing a supply of well-rotted farmyard manure—than which there is nothing better for onions—bone dust is recognised in commercial production as being the best of the mixed fertilisers. Applied at the rate of 3-4 ozs. per square yard, half the quantity may be dug in when the soil is being turned over. A top dressing of wood ashes will serve to replace potash, which is scarce and expensive.

To obtain the desirable conditions necessary for good onion production, the soil should be worked down to a fine tilth and the seed bed made firm. Provided digging has been completed some time previous to planting, this soil condition will obtain. The seedlings when removed may be placed in a bunch, held tightly in the hand, and the roots trimmed evenly to 1½ inches from the bulb end. The tops, also, may be trimmed back, but not far enough to damage the apicle bud or growing point. Rows 12 inches apart and five plants to the foot in the row will produce onions of a suitable size for ordinary use and good storage.

Rhubarb

Constant shallow hoeing is necessary in order to keep weeds under control. During periods of high humidity it may be desirable to remove weeds by hand and throw them on the compost heap. To give of their best weeds must not be permitted to rob the plants of valuable nutrients.

SEEDS TO SOW DURING AUGUST.

Cape Gooseberries: In favourable localities seed may be sown for transplanting when danger of frost is over.

Capsicum: Remarks on Cape Gooseberry apply.

Turnips must be used when roots are suitable size.

Swedes: Same as turnips.

Lettuce: For succession planting.

Potatoes: Where danger of frost is past.

Spring Onions.

Parsnip: For mid-summer use.

Tomatoes: Seed may be sown where early planting can be adopted.

Asparagus

August is the best month for establishing a new bed. If crowns have to be bought from a nursery, one-year-old plants should be obtained. Either Mary Washington or Martha Washington will be a suitable variety, as both are rust resistant.

Artichokes (Jerusalem)

Where a spare part of the garden may be available tubers of this vegetable can be planted in rows 3 ft. apart, with 18 inches between the sets. Although excellent returns on good garden soil will be secured, whole or cut seed will give compensating yields on relatively poor soil. Over applications of fertilisers, particularly nitrogenous, will produce top growth at the expense of tubers.

Times of Planting

Information has been requested with regard to the relative months in New Zealand to those indicated in publications concerning gardening practices in Great Britain and U.S.A. Following is the acknowledgment:—

Great Britain and U.S.A.	New Zealand.
January	July
February	August
March	September
April	October
May	November
June	December
July	January
August	February
September	March
October	April
November	May
December	June

To readily obtain the exact month by comparison, six months should be counted after that indicated. Thus, if September is referred to in a publication from the respective countries referred to, March would be the relative month in New Zealand.

—D. K. PRITCHARD, Instructor in Vegetable Culture, Wellington.

Phenothiazine

THE effectiveness of phenothiazine against the various types of internal parasites of livestock, together with details of the dosage rates, are contained in the **free** bulletin No. 189 obtainable from the Department of Agriculture at Auckland, Wellington, Christchurch and Dunedin.

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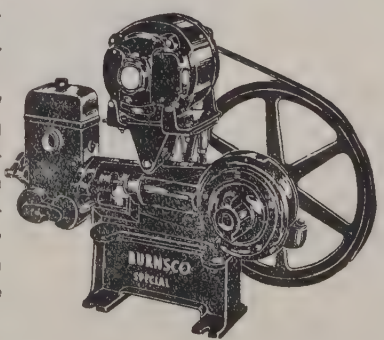

The Principles and Practice of Incubation

(Continued.)

By F. C. BOBBY,
Superintendent of Poultry Husbandry,
Wellington.

The Incubator Room

Conditions in an incubator-room may substantially influence the incubation results obtained from any type of machine, even modern cabinet machines. Two factors in an incubator-room should receive careful consideration. A regular slow change of atmosphere should be taking place at all times, thereby ensuring an adequate supply of the all-essential oxygen, and at the same time the exhaustion from the room of undesirable gases such as carbon-dioxide. This change of air is most easily achieved by inlets through the walls, placed about one foot from the floor level, with outlets of a slightly greater size placed in or near the ceiling. The smaller the incubator-room the greater the necessity for watching the ventilation. Big rooms, having a larger cubic capacity affording a surplus of fresh air, reduce the necessity for changing the atmosphere in the room so often. **In a dry climate**, if the change of air is too rapid, it may become difficult to maintain sufficient humidity in the air to aid successful hatching.

It is desirable to maintain an even temperature in an incubator-room at a moderate level of, say, 65 degrees F. With low temperatures, electrically-heated machines consume more current, since the electrical elements must operate for a greater period in the full day to maintain the desired temperature. Big fluctuations of room temperature may render it more difficult to keep a steady incubator temperature. If the hatching eggs are held in the incubator-room prior to being placed in the incubators, it is important to remember that a temperature of over 70 degrees F. may be far more detrimental to the hatching eggs than one of, say, 40 degrees F., although it is common to find poultrymen more concerned about a drop in temperature in their incubator-rooms.

It seldom occurs to poultrykeepers that a high temperature for an appreciable period during the day is more dangerous than a low night temperature. The high temperature starts germination, while a fall in temperature later in the day will kill this freshly-germinated cell. Providing germination has not started, temperatures as low as 40 degrees F. down to 35 degrees F. will do little harm. Frost, or 32 degrees F., is obviously dangerous owing to the tendency to split the shells, quite apart from killing or seriously weakening the germs.

Much can be done to lessen temperature fluctuations by building the incubator-room where it has some protection from the midday sun, and by the use of insulating materials in the walls. A double wall with an air space or "air lock" is an excellent insulator.

Starting the Season

Certain precautions should be taken each season before starting up the machines, irrespective of the type to be used. All machines, except large cabinet machines on concrete bases, should be checked for level. An incubator must be level to prevent "hot corners" at the high spots. The interior of the incubator, together with all the interior fittings, should be thoroughly disinfected before putting in the first batch of eggs. If disinfecting the incubator is carried out immediately before using the machine, there is no need to dry the machine out, providing the desired temperature has been obtained before putting in the eggs.

Whether electrically or oil heated, the heating apparatus should be carefully cleaned and overhauled. With cabinet machines, where an electric motor is used for driving a fan, this motor should be overhauled each season. It may easily lead to disastrous results if a motor or heating element breaks down after the machine has been filled with eggs and has been running for some days. Such breakdowns are liable to occur with carelessly-treated electrical equipment. Under present war conditions, a further word of warning is necessary. It is particularly difficult to obtain replacement parts for electrical equipment, and in consequence it is the responsibility of every poultryman to give special attention to such equipment in order to reduce wear and tear to a low level.

Since the maintenance of a constant temperature is an essential factor in efficient incubation, it is obvious that thermometers should be checked before the season starts. This may be done with water around 100 degrees F. and a reputable clinical thermometer. It is also a safeguard to check that the wafer thermostats are operating. This, again, may be done with water between 90 degrees F. and 100 degrees F., but in both cases water of a greater temperature must not be used. Machines should be adjusted for temperature after being started up, and tested at the desired temperature for at least 24 hours before placing the eggs in the machine.

Running an Incubator

Since types and makes of incubators vary so considerably, it is impossible to set out definite instructions applicable to all makes of machines. Accordingly, novices in incubation operations, or more experienced poultrymen using a new make of machine, are recommended to follow carefully the maker's instructions for at least a few hatches. However, local conditions have a marked effect upon incubation, and even the maker's instructions are not sufficiently comprehensive to cover the

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widely different conditions existent in the many localities where incubators are operated. It is here that the poultryman must acquire experience of his own district, and by trial and error gradually modify the maker's instructions until the best results are obtained.

The two principal factors in running an incubator, upon which experience must be gained, are the requisite amounts of ventilation and moisture required by the incubator used. The maker's instructions will form the basis upon which to start in each case, but greater or less moisture or ventilation than that recommended by the maker may prove necessary, according to local conditions and the type of incubator-room used.

For owners of cabinet machines, a few words regarding humidity gauges may be of value. There are two types of gauges supplied with cabinet incubators, the circular all-metal type and the wet bulb thermometer type. Of the two types, the latter has been found more reliable.

Wet bulb thermometers consist of a thermometer with a wick attached to the bulb and running into a small glass vessel of water. For the satisfactory working of this type, it is essential that the wick should be kept supple, free of deposited salts, and moist. If ordinary tap water is used, as this water evaporates on the wick minerals in the water become deposited as salts on the thermometer bulb and on the surface of the wick. When this occurs the desirable continuous flow of water up from the glass vessel by way of the wick to the thermometer bulb is retarded, until eventually it stops.

Should this happen, the thermometer will immediately give a high reading and lead the operator to believe that a high state of humidity exists in the machine, whereas, in fact, the humidity existent may be too low. These "false" readings may be entirely avoided by using either distilled water or rain-water, collected in an earthenware or glass vessel. In any case, these wicks should be taken off periodically and boiled to remove any residue of salts, dust, or chick fluff which may have collected on the surface. This practice will ensure the efficient working of this type of humidity gauge or hygrometer.

On the other normal routine practices of running an incubator, the following comments are offered for general guidance.

(a) **Setting Eggs.**—If hatching eggs have been stored in an incubator-room with a moderate temperature, these eggs may be placed straight in the machine and allowed to warm up rapidly. On the other hand, should eggs be particularly cold when placed in an incubator and their temperature then raised rapidly, this will often result in "broken yolks," i.e., the yolk material will expand in the heat of the machine too rapidly and burst the very delicate membrane (vitelline membrane) which surrounds the yolk. Cold eggs should be gradually warmed up in a moderate temperature for some hours before being placed in the incubator.

(b) **Turning Eggs.**—Turning eggs daily between the third and seventeenth or eighteenth days is known to be essential for satisfactory hatching. Most poultrykeepers turn their eggs twice daily, but it is not generally known that the majority of research work conducted on egg-turning during incubation points to the fact that turning more often, say, four or even five times daily, tends to give improved hatching results. Turning three or four times daily is a common practice in large hatcheries in both the United States and England, where cabinet machines with automatic turning devices are in use.

(c) **Cooling.**—There is no evidence to show that any advantage is gained by cooling eggs incubated in cabinet machines. In the instance of table-top machines some benefit may accrue from the practice of cooling during hot weather, when temperatures in the machines are liable to run high and when **additional ventilation for the eggs** is of real value. Such cooling should not be started until at least the fifth day, and will, of course, cease at the eighteenth day. Much damage

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can result from cooling during cold weather, particularly if the period of cooling is prolonged.

(d) **Testing Eggs.**—Testing at least once during the hatching period is strongly recommended. A first test is advised at between the eighth and tenth days, when the eggs are either placed individually before a strong light, shaded except for a hole cut in the shape of an egg, or lighted up with a specially-constructed light, while still in their incubator-trays. By carrying out this early test, infertiles are noted and removed; thereby indicating whether any particular breeding pen is giving an undue number of infertiles, in which case unsatisfactory male birds can often be traced. Infertile eggs are easily distinguished, in that they resemble a fresh egg.

The next type of egg to be removed is the "dead germ." In these there is usually a black spot, representing a germ which has started to develop but has been weak, and subsequently died after a few days of development. Such eggs have no well-developed blood-vessels typical of a normal fertile egg at this stage. Often the dead germ is stuck to the side of the egg, or has a blood (or pink) ring surrounding it. Addled eggs are also easily detected, and should be removed. They contain dead germs at various stages of development, and are surrounded by a floating mass of dark-coloured liquid.

A second test may be carried out about the sixteenth day, when late dead germs are removed. This second test is usually only desirable if the first test has resulted in a lot of bad eggs being removed. After testing, setting space in the incubator may be gained by condensing the eggs together, providing only eggs at the same stage of incubation (i.e. from the same hatch) are placed together.

(e) **Taking Off the Hatch.**—In general, once hatching starts, such eggs should not be interfered with until the vast majority of chicks have come off. It is an unsound policy to open the machine while hatching is in progress, moisture is lost, and a possibility of spoiling the hatch is run. When the hatch is practically finished, it is often a good policy to remove some of the easily-accessible empty egg-shells, and thus make more room for the chicks while drying off. It is not a sound policy to attempt to help out late-hatching chicks. Such chicks are usually weak and unlikely to become profitable chicks if they live. Crippled or deformed chicks should be killed off as soon as observed, since the sound practice of continuously culling poultry starts as soon as chicks are hatched.

(f) **After the Hatch.**—When all the chicks have been removed from the incubator, the trays should be cleared of the dead-in-shell (unhatched eggs) and empty egg-shells, after which the trays should be **thoroughly washed in water containing a good disinfectant.** Such trays are then ready for the next hatch. Any carelessness in the matter of cleaning and disinfecting trays between hatches may result in the spread of disease from one hatch to the next. This particularly applies in cases where pullorum disease exists among the chicks.

(To be continued).

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Chick-sexing Instruction

ALL those who are interested in learning how to sex day-old chicks are recommended to write to A.C.2 W. H. Barnes, Waihunga, Western Hutt Road, Lower Hutt.

Aircraftman Barnes has intimated to the Department of Agriculture his intention to run instructional classes in chick-sexing during July, August, and September, if sufficient candidates come forward for instruction. Prospective chick-sexers are reminded that the Department will hold an examination at the end of the hatching season (November), in order to give any candidates who have trained this season an opportunity of obtaining first-class chick-sexing certificates.

Building Materials

POULTRY-KEEPERS, like many other primary producers, are still experiencing difficulties in obtaining the necessary building materials and equipment to enable them to expand their poultry plants for increased production. Resulting from a further appeal for assistance in this matter by the Auckland Provincial Council of Registered Poultry-keepers, the Commissioner of Defence Construction has issued instructions concerning the release of available supplies of timber, roofing, cement, piping, and wire-netting, which it is hoped will speed up the release of these materials.

Accordingly, poultry-keepers are requested to send to the Poultry Instructor for their district a statement of the exact quantities of any such materials required. These details should be set out clearly on a separate sheet of paper, supported by an accompanying letter stating the purpose for which the materials are required, i.e., a brooder-house, or a laying-house, including details of size, for the accommodation of so many extra birds, etc. Such applications will be recommended, or otherwise, by the Poultry Instructor or the district Primary Production Council, and passed to the Building Controller for the district concerned. The latter will be responsible for releasing the materials required as soon as possible, if available supplies permit. Poultry-keepers are warned that certain materials, such as water-piping, are in very short supply, and in consequence Building Controllers may be unable to give an immediate release of any such materials.

Federation of Young Farmers' Clubs

Taranaki Regiment Young Farmers' Club

AT the inaugural meeting of the Taranaki Regiment Young Farmers' Club, recently formed at Awatapu Military Camp, Palmerston North, addresses were given by Captain M. Cooper, of the Army Education and Welfare Service, and by Mr. H. de O. Chamberlain, Department of Agriculture. Captain Cooper's address, as reported by Sergeant J. L. Carey, the club secretary, is reproduced here; it is hoped to print Mr. Chamberlain's address at a later date.

Captain Cooper gave a brief talk on the subject of "Farming." He said that a large proportion of our troops who had followed a sedentary occupation before mobilisation wished, on the conclusion of the war, to go on the land. These men must have enough knowledge of farming to be able to start correctly, as, although farming looked glamorous from the city man's point of view, unless a young man starting on the land had sufficient knowledge of farming to enable him to work and plan correctly, he might become involved in a life of drudgery and hard work from daylight until dark. It was the aim of the Young Farmers' Clubs to avoid this and to enable men to start with the right ideas. He said that the stability of New Zealand depended upon the prosperity of the farming community.

The speaker also emphasised the fact that most townspeople were closely linked with the country, as nearly all of them had relatives or friends there whom they visited from time to time, town children in particular spending a large part of their school holidays visiting relations in the country. Any trend towards a cleavage between town and country must be avoided, because, if the farming community suffered, the townspeople would suffer also.

He went on to stress the point that farming, being a natural life, gave people a fuller understanding of nature. The fact that the reproduction of domestic animals was very similar to the reproduction of the human race, and that the laws of heredity were also similar, gave to farmers a better understanding of life.

A farmer had his mind on his work the whole time, some of his tasks developing an interest that the city man could not realise. Improving land, raising it from low production level to a point where it was capable of the highest possible return; breaking in virgin land—these things, combined with the improvement of flocks and herds, particularly pedigree breeding, made the farmer's life one of intense interest. After a day's work, well planned and carried out, the farmer felt that he had achieved something worth while.

In conclusion, Captain Cooper emphasised the value of Young Farmers' Clubs, not only to men starting on the land, but also to older farmers. For young men, lectures on important subjects, visits to the studs of successful breeders, and courses at Massey College, etc., would be of the greatest value; while play-reading, debating, reviews, all with an agricultural background, would help to broaden their minds. He considered that at Awatapu Camp there were enough troops to form a strong club, but that even a small club would be an excellent idea. From division he assured the meeting that such a club would receive every possible support in the way of lectures, films, etc.

Dannevirke Y.F.C.

(By J. L. Sunderland, Acting Secretary, Dannevirke Y.F.C.)

A SPECIAL meeting of the Dannevirke Club was held on the occasion of a visit from the Dominion President, Mr. D. S. Ross, who was accompanied by Messrs. S. G. Avery (Chairman, Wellington Council), B. J. Collerton (Wellington Council), and S. Freeman (Dominion Organising Secretary). The visitors were making a tour of a number of District Committees within the Wellington Council area, and as the Southern Hawke's Bay committee was more or less in recess, and the Dannevirke Club the only one functioning in the district, the special club meeting was held with the idea of stimulating interest throughout the area.

The visitors were welcomed by the chairman (B. Ellingham) and the advisory president (Mr. L. Feierabend). In their addresses Messrs. Ross, Avery, and Freeman all expressed pleasure to find the club functioning and in a healthy state, and gave valuable suggestions and helpful advice in connection with the future of the club. The visitors were thanked on behalf of the club by W. Simmons.

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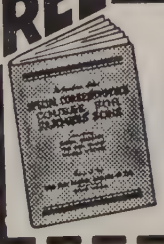

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ADDRESS .....

..... J.A.

The opinion was expressed that, as the District Committee was not functioning, it was a great pity that the club should not have representation at the meetings of the Wellington Council, and at Mr. Ross's suggestion the following delegates were elected to attend the council's annual meeting:—Mr. B. M. Bary (advisory member), B. Ellingham and J. L. Sunderland (active members). The meeting concluded with an enjoyable supper. There were 24 members present.

Annual Stock-Judging Competition

THE Methven club was extremely fortunate in being able to hold this year's annual stock-judging competion at "Aberdeen," the very fine farm of the advisory president, Mr. R. J. Low, a notable stud sheep breeder.

Over thirty members were present, and as a handsome silver cup, recently purchased from club funds and valued at five guineas, was to be competed for for the first time, keenness was the order of the day.

Two classes of sheep were judged, Southdown and English Leicester. After an instructive criticism of the two types had been given by Mr. Low, the members were allowed some time in which to examine the sheep, which had been specially picked to test the knowledge of competitors. Each member was then put through a brief oral test. The three members making the best attempts in each section were then given a more extensive test on other sheep of the same breed, and the results were as follows:—

Southdown Section.—J. Oldfield, 1; J. Dixon, 2; J. McKendry, 3.

English Leicester Section.—J. Oldfield, 1; M. Poff, 2; T. Callaghan, 3.

Congratulations were expressed to J. Oldfield on his double win, and to the other four competitors, each of whom qualified for a Y.F.C. stock-judging certificate. Opportunity was taken of the little time left after the judging to have a quick walk over Mr. Low's farm, and many discussions took place on various farming matters, including stud-breeding and pasture management. At the conclusion of the day the club chairman, R. Wightman, expressed special thanks on behalf of the club to Mr. Low for the excellent field day, which had been both profitable and entertaining, and to Mrs. Low for a very enjoyable afternoon tea.

Reports on Club Activities

WESTERN SOUTHLAND.

Dipton.—The chairman, Bruce Sinclair, handed in his resignation as he is shortly to be posted to a R.N.Z.A.F. Station; J. M. Crawford was unanimously elected to fill the vacant position. E. Shuttleworth was elected as vice-chairman. It was decided to call a meeting for the formation of a Y.F.C. gymnasium class. Arrangements for debate at next meeting. Teams selected, subject to be "Are Machines Beneficial to Mankind?" Fifteen members attended out of total membership of seventeen.

Orepuki.—Honorarium of £1 1s. voted to the past secretary for his services. A field day to be held at Pahia, to take the form of dog trials, calf competition, and grass plot demonstration; a dance to be held at night. Arrangements for a debate at the next meeting. Fifteen present.

Warepa.—As the speaker for the evening was unavailable the meeting was confined to business discussions. Club to take over control of local library; two members detailed to arrange the moving to the hall. Secretary to get in touch with the manager of the Freezing Works to arrange date of club's visit of inspection. Suggestions were received for lectures and lecturers at future meetings, the subjects chosen being "Rabbitting," "Bookkeeping on the Farm," "Dressing Poultry," "Picking Fat Lambs," "Growing Potatoes in the Warepa District," and "Fencing." One new member enrolled; ten members present out of total of nineteen.

Wyndham.—Annual meeting. Officers elected: Advisory president, Mr. J. F. Dunbar; chairman, K. Townley; secretary and treasurer, T. B. Hunter; committee, R. Hunter, T. Rabbidge, E. Rabbidge, M. Thwaites, M. Rule, A. Howden, L. Mitchell, I. McDonald; delegates to district committee, E. Rabbidge (senior member), K. Townley and T. B. Hunter (active members).

EASTERN SOUTHLAND.

Five Rivers.—Business meeting; discussion re club activities for current year. Officers elected at annual meeting: Chairman, S. Gibson; secretary and treasurer, D. G. Muir.

NORTH OTAGO.

Enfield.—Discussion on club competitions. An interesting talk was given by club member, W. Stuart, on "Gas Producers." The speaker emphasised the fact that although it may be cheaper to run a motor-car on gas fuel, only 60 per cent. of the normal power is developed. Fourteen members present out of membership of twenty-one.

SOUTH CANTERBURY.

Waihaorunga.—Annual meeting. Officers elected: Advisory president, Mr. G. Barclay; chairman, J. Barclay; vice-chairman, G. Armstrong; secretary, J. S. Harris; Press reporter, A. Armstrong; committee, J. Barclay, A. Young, S. Harris, G. Armstrong, C. Davis; patriotic committee, B. Burnie, C. Davis, S. Harris; trustee, J. Barclay. The chairman gave a detailed report of the Dunedin conference. It was decided that, for ordinary meetings, the chair should be taken by one of the members from the floor.

MID-CANTERBURY.

Ashburton.—Decided to hold a social, arrangements to be left in hands of social committee; proceeds to be in aid of the Red Cross. Interesting talk by Mr. W. H. Vaughan (an advisory member), in which he demonstrated how to give a short report on a club visit to a factory, such as the flour mills, etc. Sixteen members attended out of a total membership of twenty.

Methven.—The chairman, R. Wightman, presided over an attendance of thirty members and three visitors. After club business had been disposed of a mock meeting was held for which a new chairman and secretary were elected, the remainder of the members acting as a hall committee; this proved a very successful activity. An interesting and instructive lecture on "Lime and Phosphates" was given by Dr. M. M. Burns, of Lincoln College; many questions were asked and very keen discussion developed.

CHRISTCHURCH.

Darfield.—A field day was held on Mr. R. S. Gunn's farm, and took the form of demonstrations and stock-judging. The stock were judged in the following classes:—Southdown ram hoggets, Southdown ewe hoggets, Southdown 2-tooth ewes, Corriedale ewe hoggets, Corriedale 2-tooth ewes. The placings on the day's judging were as follows:—J. Stewart, first; C. Still, second; H. Bedford, third. Fourteen members attended.

HOROWHENUA.

Levin.—Officers elected at annual meeting; Advisory president, Mr. H. J. Lancaster; chairman, R. Mc. R. Law; vice-chairmen, B. A. Bartholomew and J. Penny; secretary and treasurer, R. Speedy; advisory members, C. E. Webb, R. J. Law; committee, J. Roe, H. K. Sloan, J. Law, H. L. Marshall, N. Webb. At meetings previously unreported: Address by Mr. R. J. Law, "Land Titles"; Lecture by Lt. Blum, U.S.M.C., "American Farming Methods"; at one meeting, on the conclusion of routine business, members of the Levin Jersey Cattle Breeders' Club and the junior branch of the W.D.F.U. joined the meeting to view films of Jersey cattle, etc., exhibited by Mr. G. H. Dawick. Twenty-five members were present at the annual meeting; other attendances varied from sixteen to twenty-four.

MANAWATU.

Bunnythorpe.—After business had been dealt with an extract from the Y.F.C. constitution was read by W. Gee; T. Hyde selected for reading from constitution at next meeting. General discussion re the club's national savings account, which so far amounts to £22 10s. Raffle to be held for a lamb donated by D. Gore, to raise funds to send parcels to members serving overseas; J. Wood selected to handle the business side of the raffle, assisted by rest of club members—raffle to be drawn at next meeting. The speaker for the evening was Mr. H. Robson, his subject being "Mechanics in Regard to the Differential." Ten members attended.

Taranaki Regiment Y.F.C.—Meeting held at Awatapu military camp. Lecture by Dr. Dry, of Massey College, on "Heredity in Animals and Humans." There was an attendance of thirty-five. A field day was held at Massey College, with an attendance of forty-five members. Brigadier Peren addressed the gathering, and demonstrations were given by Messrs. Hewitt and Ballard, on "The Cheviot Sheep Breed" and "Shepherding the Cheviot" respectively.

SOUTHERN HAWKE'S BAY.

Dannevirke.—The delegates to the Wellington council meeting reported on the last meeting of that body held in Palmerston North on May 18th. The secretary reported on the annual meeting of the Dannevirke branch of the Farmers' Union. Motion of condolence to the relatives of the late Sir Alfred Ransom. Decided to read and discuss a clause of the Y.F.C. constitution at each meeting in the future. Short talk by J. Allardice on "Docking Lambs." Mr. R. J. MacDonald gave a talk and demonstration on "The Points of a Romney Sheep." A pen was erected in the meeting room and the floor covered with a tarpaulin

and sacks, four stud Romney ewes being penned therein for the demonstration. The speaker was heartily thanked for his trouble in selecting the sheep and bringing them along, and also for his very excellent demonstration.

NORTHERN HAWKE'S BAY.

Mecanee.—Annual meeting. Decided that previous year's officials should hold office for a further term, as follows:—Advisory president, Mr. S. Parsons; chairman, L. L. Griffiths; secretary, K. H. Bimler, Jr.; treasurer, W. J. Puddle; delegates to district committee, L. L. Griffiths, K. H. Bimler, Jr., W. J. Puddle. Mr. G. A. Blake, Department of Agriculture, gave a very interesting and enlightening talk on "Liquid Manure and Its Benefits." Ten members were present.

WAIRARAPA.

Masterton.—Arrangements for a dance to be held in July. Discussion re debates to be finalised at next meeting; subject proposed, "That Inspection of Rams at Ram-fairs is in the Interest of the Farmers." Lecture by Mr. L. T. Daniell on "The Disabilities under which the Back Country Farmer is at present trying to breed sufficient White-face Ewes for the Fat-lamb Farmer's Needs." There was an attendance of twenty-eight out of a total club membership of thirty-five.

WANGANUI.

Mangaweka. — Annual meeting. Officers elected: Advisory president, Mr. G. Bramley; chairman, M. Gardner; secretary and treasurer, N. Weston. This club has a membership roll of twenty-five, including five members serving overseas, two of whom are prisoners of war.

TE KUITI.

Paewhenua.—Arrangements for next meeting; Mr. H. E. Walters to be asked to deliver a lecture. G. Morris selected as delegate to attend Auckland council meeting. Impromptu speeches were given by members. Attendance of nineteen out of membership of twenty-five.

WAIKATO.

Cambridge.—Report on club dance; profit £15 8s. 4d. Arrangements finalised for another dance at later date. D. Watt elected as librarian. Telegram of congratulation to be sent to R. Giles, a club member, on the occasion of his marriage. Impromptu talks by club members, "Gas Producers" (J. Dunning) and "Procedure in Pasture Analysis" (G. C. Herbert). The evening concluded with supper. Fourteen members present out of 25.

Tahuna.—Business meeting; eight members present. Discussion re methods for increasing public interest, and for recruiting new members. The meeting was then opened to the public, and there was a fairly large attendance. The speaker was Mr. Orgram, who gave a most interesting talk on his experiences in the Tonga Islands; Mr. Orgram displayed many curios that he had gathered in the Islands.

WESTERN BAY OF PLENTY.

Paengaroa.—Suggested that next season the club hold calf-rearing competitions along the lines successfully undertaken by the Te Puke Club for the past two years. Arrangements made for the Western Bay of Plenty stock-judging field day to be held at Paengaroa in June. Practice teams selected from which to pick the club's teams for the first round of the Bay of Plenty debating contest. One new member enrolled. Mr. Bob Dunlop, of Te Puke, exhibited an interesting "movie" picture of "Old Identities" of Te Puke, together with short shots of the various shows and gala days held in the district recently. Twenty-six members present.

Pukehina.—Discussion re debating; Mr. B. Walters to be asked to assist. Three members requested to give short addresses at the next meeting. Lecture by Mr. J. Pattie on "The Early Days of the District"; the speaker in the course of his lecture made interesting comparisons with the present day.

Tauranga.—Decided to field a team for a debating contest to take place later in the month with the Te Puna Club. Impromptu speeches were given by members, and judged by Messrs. G. Hynds (advisory president) and P. Keenan (schoolmaster). L. Wilson was placed first, with J. Wright second. Mr. Keenan, who is coach to the club debating team, then gave a short, but instructive, talk on the art of speech-making. There were eight members present. At the previous meeting it was decided to hold a social evening. This was duly held, and apart from being very successful, showed a profit of 10/6.

Radio Broadcasts

THE following is the programme of Y.F.C. broadcasts to be delivered from station 1YA, Auckland:—

July 26, 7.15 p.m.—Western Bay of Plenty District Committee.

August 23, 7.15 p.m.—Organising Secretary, Mr. S. Freeman.

September 27, 7.15 p.m.—Auckland District Committee.

October 25, 7.15 p.m.—Auckland Council Secretary, Mr. E. B. Glanville.

Manuring of Garden Crops

BULLETIN 105, published by the Department of Agriculture, is designed to give full information to the home gardener on the manurial requirements of his crops. Write for a **free** copy to the Department of Agriculture at Auckland, Wellington, Christchurch and Dunedin.

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Health Notes for the Farm

Why Can't We Check Hydatids?

Contributed by the
DEPARTMENT OF HEALTH

IN spite of all that has been written and taught about hydatid disease in recent years, it still seems to have as strong a hold as ever in New Zealand. Why can't we check it? What is wrong with our methods? The truth is that there is nothing wrong with our methods; but there is something definitely wrong with the attitude of many farmers who simply won't co-operate with the Government in its campaign to stamp out the disease.

Two New Zealanders are condemned to the operating table each week, and one to the grave each month, because of hydatids. It's a terrible confession for a country like New Zealand to make, particularly when care and common sense will help to eliminate this toll. There seems to be a considerable amount of ignorance about the nature of hydatids.

Here is the answer. The hydatid is a worm found in sheep dogs, and the dogs acquire the worms from eating diseased raw offal from sheep, or from eating dead sheep. Humans—and stock as well—catch the disease only from the worm's eggs passed by the dog. For instance, one hydatid cyst in a sheep may contain hundreds of thousands of these minute worm's eggs. If eaten by a dog, they become hundreds of thousands of worms, and when transferred to humans these eggs become cysts, or swellings. Just imagine a hydatid cyst in a person's body, slowly growing during the course of the years, and pressing more and more on the liver, or lungs, or brain, or other organs. Let's go a little further with this rather horrible story. Suppose a cyst is burst by a knock or fall. Those living worm eggs are liberated among the organs of the body—each of them capable of growing into a new cyst—a few removed at one operation, a few at the next, and so on living in the constant shadow of the surgeon's knife. It's not a pretty picture is it?

The remedy lies with the dog owners, and, if they stopped to think about it, they could save themselves a round £200,000 a year in condemned livers alone. If every farmer would do as the Government and experts advise him, and dose his dogs with arecoline, which is available at the time of registration, hydatids would cease to be the menace it is today.

Questions Answered

A correspondent recently raised three rather interesting points regarding hydatid infection, and the answers given will be of general interest. In the first place he asked whether meat from infected animals, when cooked, was capable of infecting anyone. The answer is that cooking the liver, or any meat, from sheep, cattle, pigs, or other animals, makes it perfectly safe for food. On another point raised by the correspondent, he was told that dogs with hydatid worms spread hydatid eggs in their droppings. These are scattered over the grass, on the dog's snout, paws and skin, on the wool of sheep, on the hair and udders of cows, and into water, and so on. Pollution of hands and pollution of food may therefore easily occur, and the transfer of that pollution from the hand to the mouth, especially in children, is understandable. Consequently, careful handwashing after handling or petting a dog, or other animal, will be helpful in hydatids prevention.

On the correspondent's farm they drink creek water, which passes through a large sheep farm before reaching the homestead. He was anxious to know if running water destroyed hydatid eggs that might find their way into the creek, or whether risk of infection existed from drinking the water. It was pointed out to him that hydatid eggs soon sink in water, and there is not much risk of swallowing them in the water that is ordinarily drunk. To be on the safe side, however, drinking water in these cases should be boiled.

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WOOLWORTHS AND TOILETRY COUNTERS.

THE GOOD NEIGHBOUR.

I WISH you could see the cyclamen that has burst into sudden glory on my window-sill! No words of mine could describe the beauty of it—the shade is one of those beautiful tonings in between scarlet and purple, so rich to look at, so delicate to touch. For months my flower-pot was just a container for some earth, then there came a shoot, and later the reward of many months of waiting—this perfect flower. Encouraged by this success, I have been on a shopping expedition, and what do you think I have now? Why, some funny brownish bulbs that one day will delight me with their beauty when they blossom forth as dainty hyacinths. I never like to know what colours I am buying, so I purposely refrain from enquiring, and then it is such fun watching and waiting and wondering! And after its flowering, the bulb is taken out of my flower-pot on the window-sill, to find a home in my garden. Did I ever tell you of my bulb garden? It grows outside my bedroom window, and two years ago it came to me from "Mary Ann." She sent me the box of bulbs, which I planted round the ngaio tree, and they are coming up again, "Mary Ann." Only this morning I saw the first shoots spearing their way up through the damp, cold earth. What a miracle is unfolded each time a bulb bursts into sudden life. Reminds me of a poem I used to recite in my childhood days, and which I remember yet.

"The little bulb house is a house of brown,
Its doors are locked, and its blinds are down.
Winds may whistle and winds may creep,
The little brown house is a house of sleep.
But when the sun gives a golden knock,
The blinds go up, and the doors unlock.
The sleepy tenant will softly stir,
And throw off the garments that cover her.
And she will put on her dress with care,
A Hyacinth Lady, tall and fair. . . .
All this magic in scent and blue
You may buy in the shop for a copper or two!"

From Me To You

What a wealth of solace and comfort is to be derived from a garden! In my mail this week I had an interesting letter from "Hydro," and I want to share it with you all, for I know there are many of you with suffering hearts and haunting fears to whom her letter will come as an inspiration.

She writes: "Lately, in between all the family cares and chores, I have been planting cuttings of the lovely little barberry with the orange and red berries, down both sides of our curving drive—they are about the only things the horses won't eat, and they will not be too heavy to keep the sun from the drive. Also at odd moments during the past summer and autumn, I have planted groups of narcissi around the drive, and am looking forward to their beauty in the springtime. But a friend said bitterly one day: 'You would be better employed doing war work—this sort of thing could be left till after the war. The boys won't appreciate it when they come home.' Do you think so, Mary? When so much is being destroyed I think it is a duty on our part to preserve what beauty is left, and create new beauty wherever possible—just in odd moments of our full days. Although our own beloved soldier will never come back to us, I know half-a-dozen others who will, and I feel very sure that at least five out of the six will be very grateful for any touch of beauty, physical or spiritual, which may help to wipe out the memory of those terrible years."

Thank you, "Hydro," and I do agree with you. Also I am sure that there will be many readers who will want to send their thanks, too—there is something about a garden which is enduring, and which will outlast many troubles, lifting our hearts high above the worries of today. So I leave you with this last thought:

"You are nearer God's heart in a garden
Than anywhere else on earth."

Remember that, those of you who are heavy-hearted and saddened by the events of today, go back to your gardens, and in building up a new beauty you will find there a peace of mind that will do much to restore your faith in the world in which you live.

Mary

Competitions

JULY

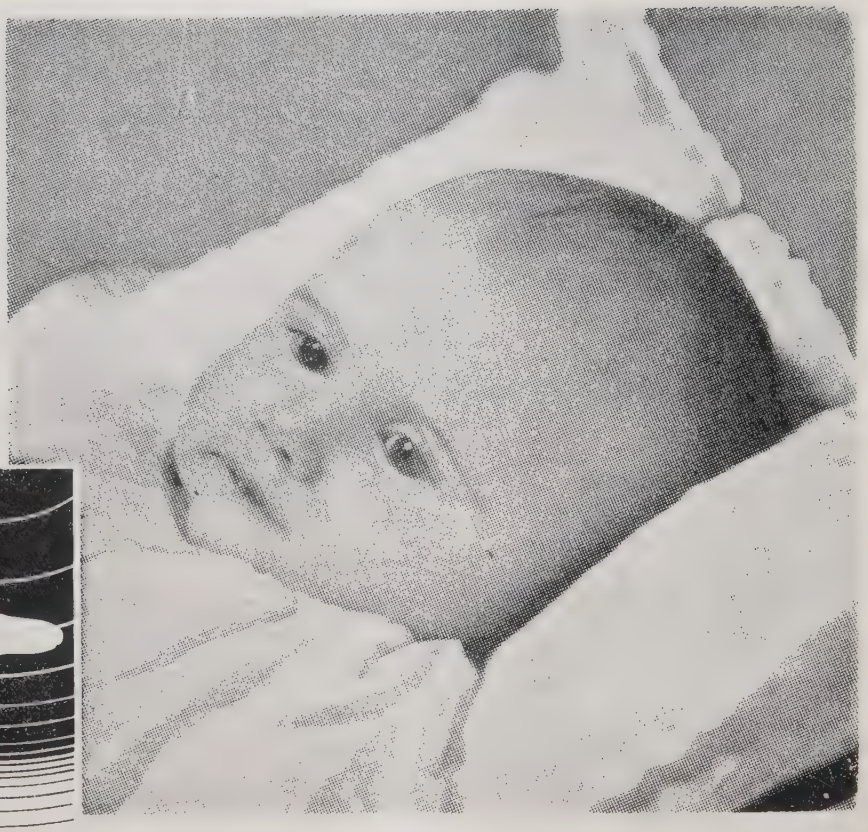
Hurry up with your entries for this month's competition, for remember it closes on August 15th, and the subject is "Awkward Moments." How I am looking forward to laughing with you over what was once an awkward moment!

AUGUST

How hard are YOU working in the effort to win the war? This question is not meant in a reproachful way, for I know that many of you are shouldering a man's job and doing it splendidly. What I really want to find out is just how you, as a farmer's wife, have rearranged your daily household duties to permit of time to be spent in helping out with the farm work. Many women of today are doing all their pre-war household work, with an additional and sometimes heavy work on the farm, and yet we thought once we were busy in those days of peacetime!

Some of us may gain useful knowledge through your way of rearranging your work, so do let us share your way of doing two days' work in one. Two prizes: first, 10/- and second, 5/-. This competition closes on 15th September.

"MARY,"
C/o "Journal of Agriculture,"
P.O. Box 3004, Wellington.



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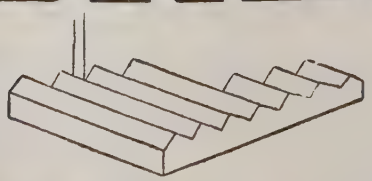

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STRANGE PHOBIAS

THIS was such a different competition! By that I mean that every one of you sent in an entry disclosing a fear of a different kind, and how hard was the judging no one knows but myself. However I think "Laurel" of Fielding has sent in the winning entry, and I am sure you will all agree with the closing sentence in her contribution. Second prize goes to "Blue Bell," of Temuka—I am not quite sure whether any name was ever coined for her particular kind of phobia, but I am sure of this—that it is a phobia known to a great many of you.

First Prize:

MY strange phobia was the intense and unaccountable dislike of touching a fish, either alive or dead. Once when a small girl, my brothers dared me to lift the two goldfishes out of the bowl which stood on our hall stand. It took a great deal of will power for me to do this, but I managed it, and escaped being branded a "cowardly-custard." I can still remember the awful feeling as I did the deed, with a heart that seemed to be throbbing every bit as much as those of the two poor fishes.

Once in my teens our help was called away, and mother was ill in bed. My sisters were married, and living in other towns long ere this, and the first night I couldn't settle to sleep, for as I tossed and turned I wondered if I could cook the schnapper that I knew was in the safe for next morning's breakfast. I thought I could manage to cook it if only I didn't have to handle it much. I fell asleep and woke in the morning to find the breakfast ready cooking, Father having put on the porridge and prepared the fish. What a relief!

After I married necessity made me overcome my phobia, as following an illness my husband was put on a diet including steamed fish three or four times a week, although I must confess that I did not even then handle the fish any more than I could possibly help. Time passed, and a sister who was 16 years my senior was staying with me, and I happened to say that I could never understand why touching fish was so abhorrent to me. I then learnt that when I was a toddler someone came to our home bringing a string of fish, and I had been frightened of the shining, scaly things because one of the family had playfully chased me with one. She had remonstrated with the foolish one, and the incident was apparently forgotten. A few years later she married, and once when she heard me say I loathed touching fish she thought it was because I was fussy about my hands!

If you have a phobia do your best to find out why, and I hope that yours will disappear as mine did.—**Laurel, Feilding.**

Second Prize:

IT has been a busy day (well, most days seem to be the same), but we'll say this was washing day, accompanied by the scrubbing jobs, verandahs, dairy and so on; then the ironing to finish the day, so Mother feels bed will be a most welcome place, and climbs into her haven of rest, hoping against hope that there will be no disturbance until getting-up time on the morrow.

2 a.m. Mother's slumbers are aroused, and a strange fear passes through her —surely that was not Baby awake? How she hopes it was a false alarm, for she is so tired. But listen, her worst fears are realised, and she must get up to the wee man. It may mean it will be an hour or so before she can settle down to comfy sleep again, only to be awakened shortly after by another young man who "wants to get dressed."

I wonder how many mothers share this phobia of mine when wakened in the small hours?—**Blue Bell, Temuka.**

Do You Know These "Phobia" Words?

YOU may find this list useful sometime—often it is difficult to be quite sure of what is the correct name for that phobia you suffer from, or have heard others talk about. As you know, a phobia is a fear, so here is a list for you:

Acrophobia.—High places (looking down).
Agoraphobia.—Wide spaces.
Algophobia.—Pain.
Astrophobia.—Thunder and Lightning.
Claustrophobia.—Confined spaces.
Hematophobia.—Sight of blood.
Hydrophobia.—Water.
Lalophobia.—Speaking or attempting to speak.
Rupophobia.—Dirt.
Necrophobia.—Dead bodies.
Nyctophobia.—Darkness, night.
Phonophobia.—Speaking aloud.
Photophobia.—Light.
Sitophobia.—Eating, repugnance to food.
Taphophobia.—Premature burial.
Thanatophobia.—Death.

CLAUSTROPHOBIA is what my fear is called. It is a morbid fear of being shut up in a confined space, of horror of crowds, crowded places, lifts, cars, aeroplanes, in fact a fear of any place from which I cannot see an easy exit, and plenty of fresh air. I am like the woman in the story who was staying at an hotel, and who awoke in the middle of the night gasping for air. She got up, and in the dark tried to open the window, but that seemed a fixture, so she took her brush, and broke it, then she went back to bed and slept till morning. Imagine her dismay when she found the next day that it was not the window she had smashed, but the mirror of the duchesse. One would think from that that claustrophobia is only imagination, but no, it is more, or why would it be found in the medical encyclopaedia?—**Liza Jane, Catlins.**

FIRE! How that word sends chills up and down my spine, my heart nearly suffocates me with its wild beating, I cannot rest but have to rush to and fro every few minutes to see if the fire is under control. We are in a fire area, and after a fire I imagine

I smell burning for days, and even wake at night thinking the place is on fire. We have had a big fire, which probably accounts for some of my fear, but I think I developed it when I was a child in Dunedin. I was awakened one very dark night by the screaming of the fire siren. I watched from the window of the top story of our house with my mother and brothers. The fire was just across the main street from us, and it was indeed a terrifying sight to see the flames licking the building, and lighting it up in the darkness. My wish is that I may never be in a fire at night. I try to conquer my fear but cannot.—**Nor' West, Canterbury.**

FEAR—how much it enters into our lives. Even the bravest of souls usually have something in their lives which causes fear, a fear often caused during childhood, the cause so remote that it is forgotten, but the fear nevertheless is still very real.

Worst of all to me there is the fear of earthquakes. Do you know it? Those of us who have lived through the 1931-32 Hawke's Bay 'quakes were and still are so unhappily situated as to work and live in a brick building will appreciate this fear. That horrible pounding of the heart and paralysis of the legs which even a tremor sets in motion. And yet how small those fears are in comparison to what must be the unenviable lot of those who live in war-wracked lands. What paeans of praise we should give to Him Who has so mercifully spared us such days and nights.—**Alix, Wairoa.**

FEAR alone will not produce a phobia. Even so there are many interesting phobias in the world. Have you ever heard of the girl who had a fixed belief that she always exuded an evil smell? It paralysed all her social life of course—she was afraid to meet people until the phobia was dispelled.

On the whole many New Zealand farmers wives are active, sensible people. You will agree with me there. Unless they have a deep-seated phobia I doubt that they are of the type that let their fears get the better of them. Especially these days when we must keep ourselves so stolid and calm and brave for the sake of our boys, and for the sake of the generation that is rising in a war-wracked world.—**Wanda A. Long, Auckland.**

RAINSTER ON ACTIVE SERVICE

Yes, everywhere Rainsters are on active service — even in civilian life they do a war job, keeping workers snug and dry and fit for duty; workers in industry, workers in the E.P.S., the E.F.S., the Home Guard . . . yes, whether man or boy, woman or girl, they're well protected when they go on duty in their Rainsters. You can't get yours? It's too bad. We're sorry. But you see, most of us at Rainster House are hard at it making Rainsters for the Navy, the W.A.A.C.S., the W.R.N.S., and the Red Cross Transport workers. Yes, of course you need a Rainster, of course you do! But you see how it is, the services have first claim. You understand. So try again later.

Mary's at - Home -

HAVE you ever seen a really glorious head of hair? I have read of hair like burnished copper and spun gold, but until the other day had never seen it. I walked down the street behind a girl of about nineteen. Her hair hung in light waves almost to her shoulders, and really shone like spun gold—it was a truly glorious sight. The owner must have spent a lot of time brushing it, as no hairdresser could produce such results.

I had a brainwave the other day, Mary. I cut out all the "Good Neighbours" I could find from past magazines, and sometime I am going to make a "Good Neighbour Scrapbook." Then when my children grow older, or when I have visitors on a wet day, or perhaps am myself down in the dumps for a while, I am sure the Good Neighbour will drop in and be most welcome. — **Hopewell, New Plymouth.**

THERE are vistors here today, friends that we all can share. The two fantails are back again, and the kingfisher in all his beauty. The little birds are all back—goldfinches, green eyes, yellow hammers—they are all back; silly birds, they think it is spring, and indeed it is deceiving, but wait until July and August. They are our two worst months up here.—**M., Fielding.**

MY home now is on the edge of the bush where we camped early in the year. Glorious to live with bush and green grass on one hand, and on the other an orchard gold-over with buttercups in the spring. And out beyond it all, hills green with pines, and mountains gravely blue. Today we found a bank of periwinkles. Anne loves to gather them in her basket and put them in a floating bowl. If you gather just the flower heads they will last a week. They seem to become more lavender-toned indoors, and often I have thought we have had a bowl of pale violets. We have been making daisy chains too—fancy that in the middle of winter!—and oh, I wish you could come and stand under the tall oak at the back door, watch the leaves fall, like little brown thoughts, and feel the soft touch of them on your face. We've watched them race the raindrops to the grass, we've watched them twirled down by a sudden breeze, but what fascinates us most is to see them flutter down when the day is still, and there is no breath of wind. Suddenly in the quietness there is a fluttering and there is a bronze shower catching the sunlight.—**Tinkle, Tinkle.**

TALKING of recipes, I quite agree with Fruffy that it is nice to get new recipes, but what is one to do in a case like this? Visiting a friend the other day I commented on a beautiful cake she had, and asked her for the recipe. She said, "Oh well! I often make it, every two or three months really, but I can't give you the recipe." Thinking she was one of those really nasty people who cherish their recipes so zealously that they refuse to hand them out, I just nodded, but she said, "Well, it's an 'Odds-and-Ends Cake.' I make it whenever I clean out my pantry. I just take a bit of butter, and so much sugar, and two or three eggs, and then I add perhaps the last of a pot of jam, or the remains left in the chutney bottle. Then I fling in all a small jug of milk, and if I haven't any milk then marmalade or syrup—just what ever I have, really. Sometimes I even throw in a saucerful of cooked vegetables. . . . Now you know!"

Well, I didn't really "know" at all, but really it was a lovely cake, and although I have tried to make an "Odds-and-Ends" cake too—well, it doesn't seem to work out.—**Alter Ego, Clinton.**

I WAS so surprised to win a prize in the competition. I spent my prize money in taking an old neighbour and her two children to a cafeteria lunch in Blenheim. They had never been in a cafeteria before, so it was a great treat for them. The children were born during the slump, and I rarely see them now that we are no longer neighbours. So you see my prize money was not frittered away.—**Maida, Picton.**

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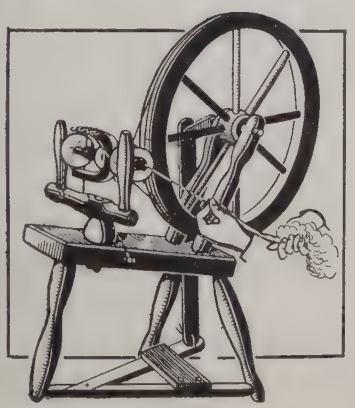
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WE used to have lots of fun when we were kiddies in many ways. But most of all we loved making those gay-coloured paper chains that we strung across the room on birthdays or other festive occasions. Sometimes we were lucky enough to have a supply of coloured paper, but more often we had to do our painting before we could begin to cut and paste. I am sure our mother felt pleased when she learned that we had to paint our paper first, for the amusement lasted so much longer.—**A.S.C., Carterton.**

ON THE BLUE HORIZON...

Skies are grey now and dreary, but look ahead—the far horizon there is blue. That blue shall someday fill the midday heavens. Halcyon days will come again, bringing beauty back. Someday you will be out again under blue skies, your man at your side, feeling with a new intensity that life is warm and vibrant . . . with a new understanding for the beauty of simple, deep enduring things. Berlei beauty — under a war cloud now — will be back. Government standardization wisely conserves the precious fund of skill and material that Berlei beauty needs, for the war which must be won, and won the hard way. But someday there will be no restrictions on our making the foundations you love. There are halcyon days ahead when we shall again be able to create for you the beauty now denied in a Berlei.

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Mary's Mixing Bowl

Recipes For Children

ARE you one of those mothers whose children will eat anything at any time and like it, especially if the food is good for them? If so you are fortunate indeed, for most children have their fads and fancies in the eating line. Variety, of course, is just as important, perhaps even more important, in the menu of the little ones as it is for father and mother, for even the best of food seems unappetising if served with too much regularity. Below I give you a selection of recipes for the children's meals which may help you out when you are asking yourself, "What shall I give Tommy for a pudding today?" Every one is worth trying.

APPLE TAPIOCA.

¾ cup tapioca, ½ cup sugar, 2 tablespoons butter, 6 apples, 2½ cups of boiling water.

Soak tapioca in enough cold water to cover for one hour. Add boiling water and cook if possible in a double saucepan for one hour. Core and pare the apples and arrange in a pie-dish. Fill the cavities with sugar, dab with butter, and pour the tapioca over. Bake in a moderate oven for one hour till soft, basting with the tapioca.

BREAD AND BUTTER PUDDING (Without Eggs).

Slice sufficient white or brown (stale) bread to half-fill a good-sized pie-dish, and spread each slice thinly with butter. Grease the dish, then lay in the slices, sprinkling some currants, sultanas, and dates between each layer, adding also a little sugar. Moisten the bread with a cup of milk. Prepare about a pint of custard made with custard powder and pour over while hot. Grate a little nutmeg on the top and cook in a moderate oven for about one hour.

JELLIED RICE.

1 packet jelly crystals, 1 cup boiled rice, ½ cup chopped dates, raisins, sultanas, etc.

Dissolve jelly crystals according to directions on the packet. When cold whip until thick and foamy. Fold the rice into the whipped jelly and stir in the chopped fruits. This dish served with a little cream is very popular.

SEMOLINA (OR GROUND RICE) PUDDING.

1 level dessertspoon semolina, 4 oz. milk.

Take a little of the milk and mix with semolina. Add to the rest of the milk, which should be boiling. Boil for a few minutes and then bake in a small bowl (standing in a dish of water) for 30 minutes. A double boiler may also be used. Sprinkle a little sugar on the pudding when serving.

ORANGE JELLY.

One orange. Cut the orange in half, scoop juice and pulp into a measure, and make up to 6oz. with water. Beat and stir in one level dessertspoon granulated gelatine previously dissolved. Pour back into orange skin and leave to set.

Rich tasting, light cakes are easily made when eggs are scarce by using 1½ teaspoons of Edmonds ACTO Cake Baking Powder instead of, and in place of each teaspoon of Edmonds ACTO Baking Powder stipulated.

NO EGGS REQUIRED!

WITHOUT EGGS!

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11.3A

APPLE CHARLOTTE.

Stew some apples with a little honey or a few chopped dates or raisins. Line a buttered pie-dish with wholemeal breadcrumbs. Fill up with stewed apples, cover with more wholemeal breadcrumbs, and bake hard in a slow oven.

STEAMED CUSTARD.

6oz. milk, 1 egg, a pinch of salt.

Beat the egg and add the milk and salt. Stand in a saucepan of boiling water or steamer or bake in the oven until just set. Do not allow the custard to boil.

SPANISH CREAM.

2 dessertspoons (½oz.) gelatine, 2 cups milk, 2 dessertspoons sugar, ¼ cup hot water, 2 eggs, essence of vanilla.

Beat the yolks of eggs and sugar together; add to milk; place on fire; stir until the mixture comes to the boil and coats the spoon. Remove from the fire. Dissolve gelatine in hot water and add to the mixture. Add the essence. Beat the whites of eggs until stiff and stir into the mixture. Pour into the mould. This dish should be left overnight to set. Do not keep the custard cooking after it has come to the boil.

BAKED APPLES.

Wipe the apples and either remove the centre with an apple corer or make an incision in the skin round the apple. Place the apples on a baking-tin with the brown sugar in the place of the core or on the top of the apples. Pour a little water round the apples and bake in a moderate oven. The time required will vary with the kind and size of the apple. One hour is an average time. The flavour of baked apples may be varied by placing a date or a spoonful of jam or marmalade in the centre of each apple in place of the core. This is a good dish for a children's party tea.

JELLY AND CUSTARD PUDDING.

1 sponge sandwich, ½ pint of custard made with custard powder, 1 packet of jelly crystals.

Put the sponge in a glass dish, make jelly and when cool pour over the sponge and leave to set. Then pour the cold custard over the top and decorate with some of the jelly crystals or hundreds and thousands.

INVALID PUDDING.

½ oz. ground rice, ½ oz. castor sugar, ¼ lemon rind grated, ½ pint milk, 1 egg.

Mix the ground rice with 1 tablespoonful milk. Add to it the remainder of the milk, boiling, also the sugar, lemon rind, and a pinch of salt. Pour back into the saucepan and boil 3 or 4 minutes. Beat the yolk and the white of the egg separately, add the yolk to the milk, etc., then the white, which must be lightly stirred in. Pour into a buttered pie-dish and bake for ½ hour in a moderate oven. If Tommy does not like custard, and some children do not, try chopping a banana into small pieces and mixing it with his custard. This often helps the custard to go down.

Table of Contents—July, 1943

Seed Production in New Zealand—A. G. Elliott. . .	1
Uncertified Grass and Clover Seeds—J. H. Claridge	5
Soil Erosion: Man's Duty to the Soil—Lai-yung Li . .	9
The Linseed Crop in North Canterbury—J. P. Beggs	11
Weeds—S. H. Saxby	15
Milk Fever in Dairy Cattle—D. Marshall	21
Pig Management: Crops for Wintering Pigs in North Auckland—E. H. Arnold	23
Conservation of Farm Machinery:	
Care of Rubber Tyres	29
Overloading Tractors	35
Oil Fuel on the Farm	37
Obituary: Mr. M. J. Scott	41
Slaughterings of Stock	43
Veterinary Notes—Livestock Division	45
Farm Practice and Management—Fields Division . .	49
Radio Broadcasts	50
Orchard and Vineyard—Horticulture Division . .	53
Guide for the Home Garden—Horticulture Division	55
Poultry-Keeping Section—Livestock Division . .	58
Young Farmers' Clubs—S. Freeman, Editor . .	60
Health Notes—Department of Health	64
"The Good Neighbour" by Mary	65

SUBSCRIPTION RATES.

The *Journal* is issued monthly. The subscription within New Zealand, which is payable in advance and includes postage, is 2s. 6d. a year. The overseas subscription is 5s. Subscriptions should be forwarded or paid direct to any office of the Department of Agriculture in the Dominion. Single copies, price 6d., are available from the Department of Agriculture, Box 3004, Wellington.

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WHOLEMEAL SCONES.

3 cups of fine or coarse wheatmeal, 3 teaspoons baking powder; or 2 teaspoons of cream of tartar, 1 teaspoon baking soda. Small ½ teaspoon salt, 1 tablespoon butter. Dates if desired, 1½ cups of milk.

Mix together wheatmeal, salt, baking powder, and dates, if used. Melt the butter. Make a hole in centre of dry ingredients and stir in lightly and thoroughly the butter and milk together. Turn dough on the baking board, well floured with wheatmeal. Press out lightly with hands and cut into squares. Cook in fairly hot oven for 20 minutes. If baking soda and cream of tartar are used in place of baking powder, mix cream of tartar with dry ingredients. Dissolve the baking soda in the milk and stir into the dry ingredients.

ORANGE CORDIAL.

4 oranges, 2 lemons, 6lb. sugar, 2oz. tartaric acid, 2 quarts boiling water.

Grate the rinds from the fruit, squeeze the juice and put into a basin with sugar and acid. Pour over this the boiling water and stir well. Leave for one day before using. Put into airtight bottles.

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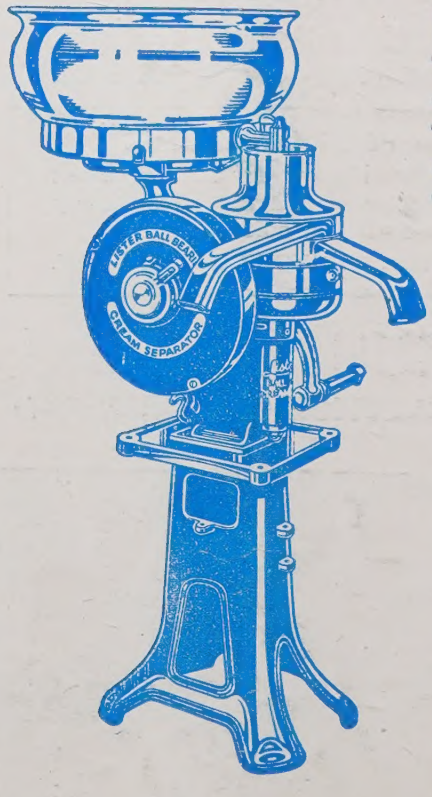

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